

Annual Show Issue

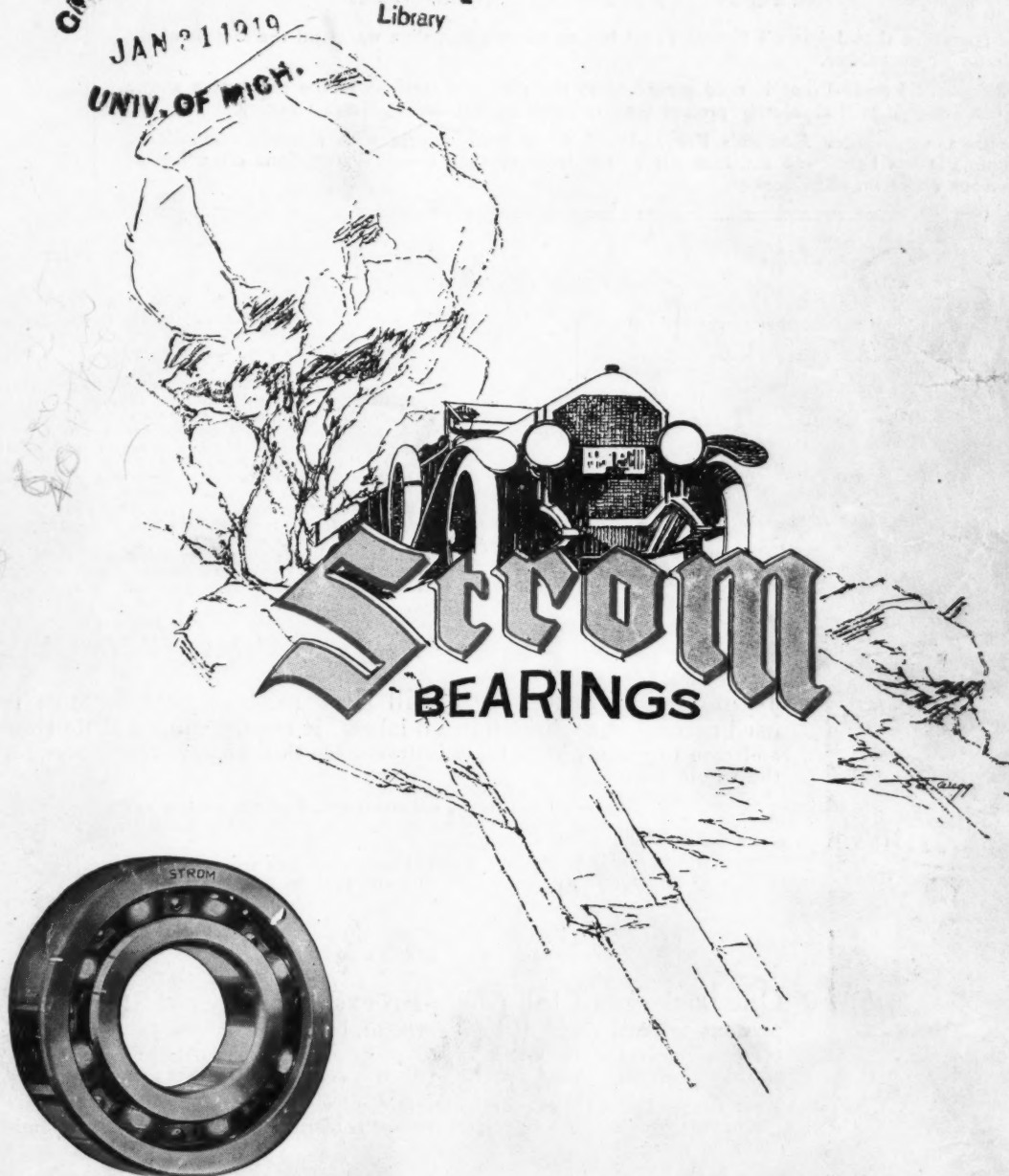
MOTOR AGE

Volume XXXV
Number 4

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is easy to use—is non-inflammable—inexpensive and guaranteed. It does not evaporate, so one application will last all winter.

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We guarantee that Johnson's Freeze-Proof has no more effect than water on the metals of the radiator or on rubber.

If Johnson's Freeze-Proof is used according to the simple directions in the proportion shown on our scale, it will absolutely protect your radiator against damage from freezing.

We do not guarantee Johnson's Freeze-Proof when used in cars with aluminum manifolds, although it has been used satisfactorily in hundreds of such cars. Water alone often has an injurious effect on aluminum.

Testimonials!

"We sell your Freeze-Proof and use it in our trucks and touring cars and it is sure fine—used it last Winter when it was 10 below and never had a bit of trouble."—A. J. Powell, Dealer in Furniture, Hardware, Linoleum, etc., Cherokee, Okla.

"We are using Johnson's Freeze-Proof this year in our own cars, also pushing the sale of it. We are selling quite a lot and our customers are more than satisfied—haven't had one come back."—E. E. Wolf, Holmes, Iowa.

"We sold about one ton of Johnson's Freeze-Proof last Winter and as it is giving such good results and is so much more economical than any other no-freeze that we know of, we will probably exceed our last Winter's business. We recommend it because we believe it to be the best."—R. B. Webb, Crystal Falls Hardware Co., Crystal Falls, Mich.

"I take pleasure in Freeze-Proof, as I used it last Winter. I left my car standing out some days when the thermometer registered 30 degrees below zero."—Wilfred L. Heindel, South Wayne, Wis.

"The writer used Johnson's Freeze-Proof in his Dodge Sedan all last Winter and with the weather 30 degrees below zero was the only one driving his car in this city."—J. S. Christensen, Christensen Bros., Greenville, Mich.

"We have sold Johnson's Freeze-Proof for two years and have had no 'kicks'."—E. R. Ames, Motor Inn Garage, Aitkin, Minn.

"I am using Johnson's Freeze-Proof in my own car for the first Winter and find it by far the best all around anti-freezing compound to use in the cooling system. Have sold considerable of it with fine results."—James C. Brown, Riley, Wis.

"I received the package of Johnson's Freeze-Proof and have been using it in one of my cars with entire satisfaction. The motor seems to run better on a cold day with the Freeze-Proof than with water."—J. E. Reifenschneider, P. O. Box No. 85, Auto Supplies & Repairs, Dover, Ohio.

"I used Johnson's Freeze-Proof last Winter, which was the most severe Winter we have ever had and I used my car almost every day and had no trouble."—Jos. F. Morton, Bayhead, N. J.

Directions Must Be Followed

Johnson's Freeze-Proof will give perfect satisfaction if used according to directions on label. It requires just a little time and care to comply with these instructions—then your worry is over for the whole winter.

- 1st—Clean all dirt, scale, sediment, etc., from the cooling system by using a boiling solution of ordinary washing soda. Flush out thoroughly.
- 2nd—Repair all leaks. Unless hose connections are new, replace them. Tighten all packing and gaskets.

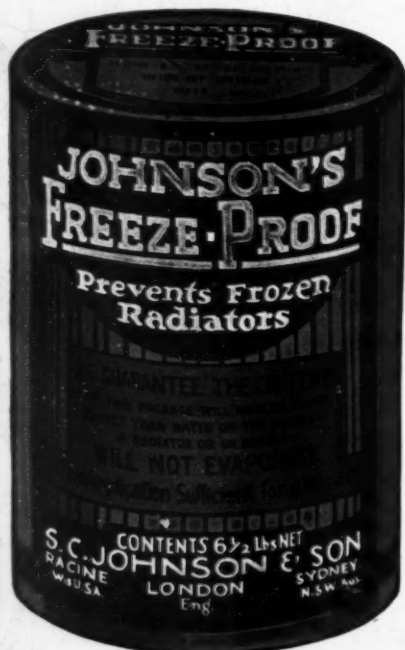
\$1.50 Protects a Ford

One package of Johnson's Freeze-Proof (Cost \$1.50) will protect a Ford to 5° below zero, and two packages to 50° below zero. For larger radiators or to protect to a lower temperature, use additional Freeze-Proof according to the scale on the package.

Your dealer has a Freeze-Proofometer and will be glad to occasionally test the protective strength of your Freeze-Proof radiator solution. This eliminates all doubt.

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MOTOR AGE

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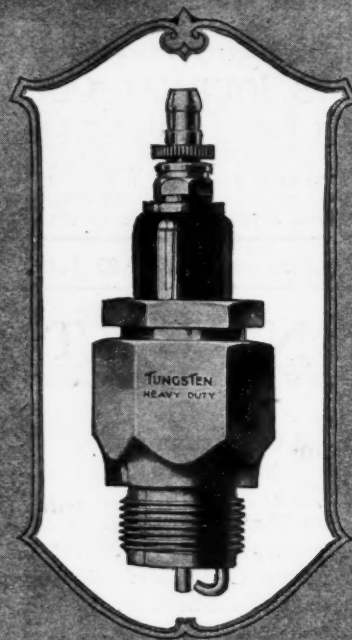
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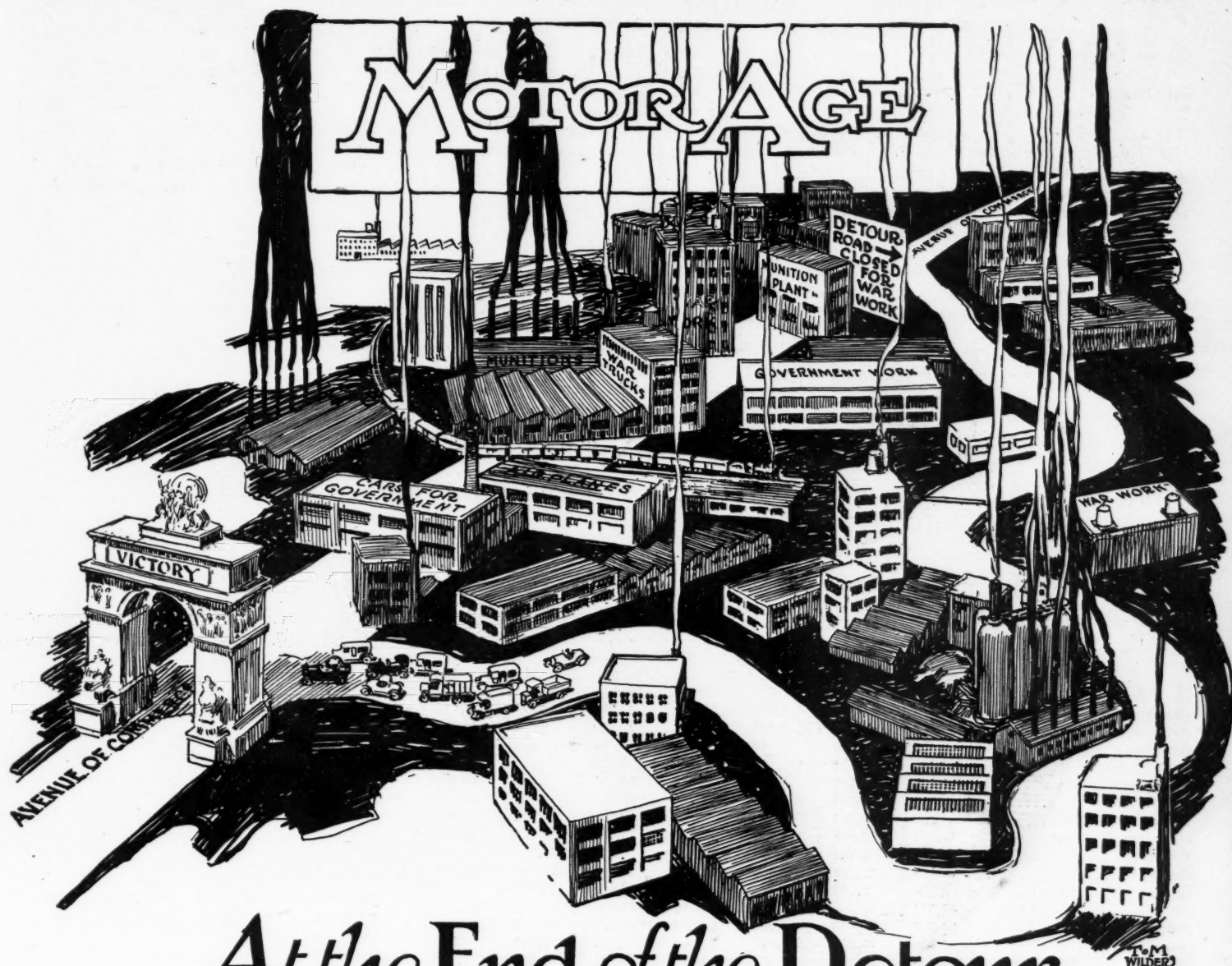


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At the End of the Detour

Dealer Shows Give Needed Impulse to Industry at
Return to Commerce from War

By Darwin S. Hatch
Managing Editor Motor Age

THE automotive industry was all set for a boom as soon as peace was assured. But it did not boom. Dealers and would-be purchasers were scheduled to rush to buy cars and trucks to fill the long-unfilled demand. But they didn't rush. The industry is not traveling along in the high-speed—things are not yet normal.

No sooner had the armistice been signed than some car manufacturers announced reduced prices—others announced higher prices—some stood pat. No sooner did peace come than the industry began wondering what would happen to the price of steel, what would wages do, would the government cancel contracts where they stood, how many army cars and trucks would be dumped on a helpless market, how long would the War Industries Board continue restrictions?

This psychological condition could have but one result. Everybody sat tight. The dealer did not order for fear prices would go

down, and the purchaser did not buy because he hoped they would. As a result the industry has been coasting—everybody waiting to see what everybody else was going to do.

In the meantime, the restrictions of the War Industries Board are off, Uncle Sam has assured us that all cars and trucks he has purchased will be used or left in Europe, steel prices are not dropping, labor is not suffering with low wages, conditions are becoming a known quantity.

Right at this opportune time, thanks to the energy of dealer associations everywhere, come the shows. Never before have the shows been of such vital importance. They are to crystallize all the hesitating, uncertain tendencies of the recent past into a certain definite decision on the part of manufacturers, dealers and purchasers to go forward. Conditions are settled, fears have been cast aside and faith revived in the world of self-propelled transportation.

This year the opening of the motor show circuit begins with the Chicago exhibition next Saturday. Heretofore the show season has been inaugurated at New York. The Chicago show, in spite of the fact that it is not promoted by the National Automobile Chamber of Commerce but, like all of the others of 1919, is backed primarily by the local dealers, partakes of national significance in greater measure than either of the two exhibitions on the coast which have preceded it or the New York show or any of the others which are to follow.

The motor car selling season which ordinarily is opened by the motor shows, finds the industry and trade in a position unparalleled in the past. The situation may be summed up somewhat in general, as follows:

- An unprecedented buying capacity on the part of the public.
- A greater potential demand than has been present in the past.
- But an apathy—a deadening of the luxury-purchasing impulse—which unjustly extended to motor cars—which has been occasioned by the

wartime propaganda for saving, for fuel conservation and the general classification of passenger cars as luxuries.

Dealer organizations disorganized and depleted by two years of war.

Service organizations in the same sad state.

Factories, which have been wholly or partially engaged in war work, faced by the necessity of changing equipment, personnel and methods from war to peace production.

Materials but lately released for passenger car production, still at wartime prices and labor in the same state with problematic periods of time before either reach a normal or stable basis.

This situation sums up into one of much perplexity for the dealer. He is convinced that the demand for cars is present but he has not begun to feel its effect. He feels, in many instances, that should the expected and logical demand develop he will not be able to secure cars to care for it. He feels that some definite means must be taken

for awakening the demand, for meeting the keen competition of his fellows and for assuring himself of cars which will mean business if the opportunity presents.

In its annual show issues MOTOR AGE always has published a forecast of what cars of the new season would present mechanically. Each year practically every manufacturer of cars in America has been represented and from the descriptions and specifications, the mechanical trends of the year to come have been summarized. The show issue always has been a most direct index of the industry and it has been possible to read the history of the year previous by a study of the cars represented in the models of the new year.

Little New Mechanically

That war has laid heavy hands upon the motor industry during the last year is evident in a study of the cars represented in this issue. The specification tables of the 1919 cars show but very little development mechanically as compared with their companion models of the year previous. With factories consecrated to war work, with engineers and production men busy on the design and manufacture of war trucks, tanks, airplanes and shells, neither patriotism nor opportunity would permit the development of new models. Nor would have such new models been a wise financial move in view of the uncertainty as to the cost or available quantity of parts and materials.

There are a few new models, it is true, but these are more definitely late 1918 than true 1919 models. Most of them would have appeared perhaps six months before this had it not been for the war.

The face of the industry as represented in these pages, however, has had a marked change, but a change which is more in numbers than in importance. Each year the complexion of MOTOR AGE's annual specification number changes slightly, due to additions to and subtractions from the list of manufacturers. This year there appears in the roster a smaller number of car names than at any time since the industry was in its infancy. This is due to two causes, one of them is that the manufacturers to a greater extent than before have concentrated upon fewer chassis models than in the past, but a more potent one is that many familiar names are missing. There are four or five manufacturers whose productions are not represented herein because, while still definitely in the industry of passenger car production, their efforts have been given over wholly or almost wholly to war-work and they have not had the opportunity since the cessation of hostilities to bring their peace-time program to a point where it could be announced at this time.

Concerns Delayed

Among these people are White, who ask that they be not represented as their new productions have not reached a sufficiently advanced stage. Brewster is another, whose mechanical plans were crystalized at too late a date to appear in the specification tables. Metz has just announced that it will change from a friction to a gear drive, which marks the passing of friction drive from the annals of American passenger cars. Simplex definitely expects to resume passenger car production with the dropping of war work and has new designs under

Registration of Cars and Trucks for Seven Years

ALL DUPLICATE REGISTRATION DEDUCTED

	Dec. 31, 1912	Dec. 31, 1913	Dec. 31, 1914	Dec. 31, 1915	Dec. 31, 1916	Dec. 31, 1917	Dec. 1, 1918
Alabama	3,385	5,435	8,425	13,798	22,354	32,873	46,155
Arizona	1,624	3,445	4,774	7,320	12,122	19,890	22,671
Arkansas	2,250	3,000	5,642	8,021	14,704	28,862	41,458
California	88,699	60,000	123,101	163,801	212,918	243,116	288,173
Colorado	8,950	13,000	17,951	26,611	44,180	66,850	70,000
Connecticut	17,950	23,263	26,218	38,950	56,048	74,642	84,902
Delaware	1,732	2,373	2,894	4,924	7,520	9,655	12,066
District of Columbia	11,902	15,625	8,000	10,200	13,118	21,198	40,045
Florida	6,749	8,372	11,366	13,123	14,220	39,216	47,059
Georgia	19,120	18,500	20,800	24,059	45,775	70,496	99,160
Idaho	2,500	2,173	3,272	7,093	12,996	24,316	31,925
Illinois	68,073	94,656	131,140	182,290	251,300	340,292	389,135
Indiana	54,334	44,738	65,500	96,915	139,138	189,433	227,160
Iowa	47,188	70,294	106,087	139,808	172,791	278,213	327,500
Kansas	22,000	34,366	50,467	74,956	114,364	154,442	186,109
Kentucky	5,147	7,210	11,746	19,500	31,500	47,400	65,884
Louisiana	7,000	7,200	3,500	10,880	20,014	31,650	39,355
Maine	7,743	10,570	14,300	18,600	28,951	38,499	42,154
Maryland	10,487	14,254	20,213	27,638	33,364	56,129	78,146
Massachusetts	51,229	60,826	76,832	89,133	136,790	155,044	176,564
Michigan	39,579	54,366	76,389	114,845	159,639	215,001	261,167
Minnesota	29,000	37,800	67,365	91,829	137,500	191,500	201,127
Mississippi	2,895	3,000	3,894	11,500	20,474	31,650	40,000
Missouri	24,379	38,140	50,998	76,462	107,865	146,142	185,146
Montana	2,000	5,686	10,706	14,520	24,585	41,896	50,125
Nebraska	33,861	47,274	50,000	59,140	101,201	148,101	175,370
Nevada	900	1,131	1,487	2,177	4,609	6,760	7,987
New Hampshire	5,764	7,420	8,738	10,819	14,338	18,146	20,458
New Jersey	35,439	39,288	58,820	67,556	75,108	87,421	129,011
New Mexico	911	1,721	3,090	4,947	8,028	14,086	16,893
New York	105,546	122,411	156,173	212,844	279,406	404,247	453,588
North Carolina	6,178	10,000	14,815	21,160	35,150	55,950	72,300
North Dakota	8,975	12,968	17,348	24,678	41,761	62,993	70,531
Ohio	63,066	86,054	121,265	179,767	252,179	333,630	417,400
Oklahoma	6,524	7,934	7,360	25,615	52,718	100,199	120,300
Oregon	10,165	13,957	16,347	23,758	30,917	48,132	66,607
Pennsylvania	59,357	76,178	107,141	150,729	230,648	325,153	370,110
Rhode Island	7,565	9,894	12,331	16,362	21,406	25,142	30,595
South Carolina	10,000	11,500	15,000	14,500	19,000	36,822	55,400
South Dakota	14,481	14,578	20,080	29,336	44,271	67,158	84,003
Tennessee	9,973	14,103	19,668	27,266	31,400	48,500	61,500
Texas	35,187	54,362	64,732	90,000	197,687	213,334	250,083
Utah	2,576	4,021	6,139	7,994	13,507	21,226	27,204
Vermont	4,183	5,430	7,613	11,499	14,251	18,550	20,764
Virginia	5,760	9,022	13,985	21,357	35,426	55,661	72,228
Washington	13,990	24,178	30,253	36,905	62,546	93,822	119,905
West Virginia	5,349	5,088	7,217	13,256	20,437	31,306	37,025
Wisconsin	24,578	34,646	53,180	81,371	117,603	164,531	196,844
Wyoming	3,300	1,584	2,428	3,976	7,125	12,001	16,150
	1,009,513	1,253,034	1,754,570	2,423,788	3,544,952	4,941,276	5,945,442

REGISTRATION AND POPULATION
DEC. 1, 1918

State	Pop. Est. 1918	Cars and Trucks	Pop. per Car
Iowa	2,224,771	327,500	7
Nebraska	1,296,877	175,370	7
Dist. of Col.	374,584	40,045	9
So. Dakota	735,434	84,003	9
Kansas	1,874,195	186,109	10
Montana	486,376	50,125	10
California	3,119,412	288,173	11
No. Dakota	791,437	70,531	11
Arizona	272,034	22,671	12
Michigan	3,133,678	261,167	12
Minnesota	2,345,287	201,127	12
Wyoming	190,380	16,150	12
Indiana	2,354,167	227,160	13
Ohio	5,273,814	417,400	13
Oregon	888,243	66,607	13
Wisconsin	2,553,983	196,844	13
Colorado	1,014,581	70,000	14
Idaho	461,766	31,925	14
Nevada	114,742	7,987	14
Washington	1,660,578	119,905	14
Connecticut	1,286,268	84,902	15
Illinois	6,317,734	389,135	17
Utah	453,648	27,204	17
Delaware	216,914	12,066	18
Maryland	1,384,539	78,146	18
Texas	4,601,279	250,083	18
Vermont	366,192	20,764	18
Maine	782,191	42,154	19
Missouri	3,448,498	185,146	19
Florida	938,877	47,059	20
Oklahoma	2,377,629	120,300	20
Rhode Isl.	637,415	30,595	21
New Hamp.	446,352	20,458	21
Massa.	3,832,790	176,564	22
New York	10,646,689	453,588	23
New Jersey	3,080,371	129,011	24
Penna.	8,798,067	370,110	24
New Mexico	437,015	16,893	26
Georgia	2,935,617	99,160	30
So. Carolina	1,660,934	55,400	30
Virginia	2,234,030	72,228	30
No. Carolina	2,466,025	72,300	34
Kentucky	2,408,547	65,884	36
Tennessee	2,321,253	61,500	38
W. Virginia	1,439,165	37,025	39
Arkansas	1,719,965	41,458	41
Louisiana	1,884,778	39,355	48
Mississippi	2,001,466	40,000	50
Alabama	2,395,270	46,155	52

Total ..105,186,167 5,945,442
Average for United States. 18

test. Jackson and Inter-State do not expect to have models until late in the year. Other concerns, including the F. R. P., may resume later.

Two California concerns, Fageol and Homer-Laughlin, have turned to tractors and trucks, definitely abandoning passenger car production. Deering, Empire and Hackett are not manufacturing at present, although, as in the case of the Empire, it may be decided to resume later.

Out of Business

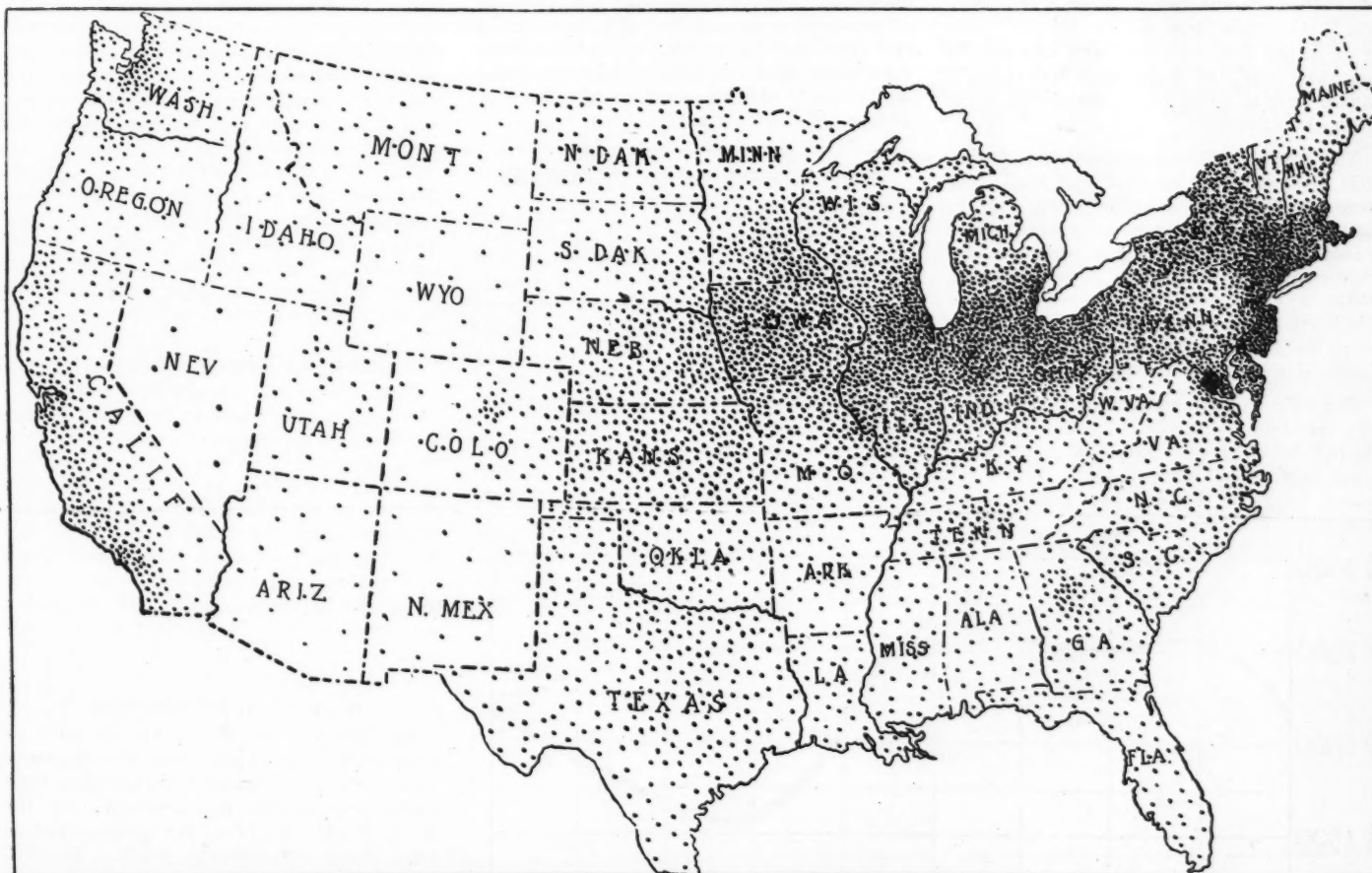
There are a dozen concerns or more which are definitely and permanently out of business either from financial or other reasons. Among these are the Abbott, Arbenz, Bour-Davis, Hal, Princess, Regal, Shad-Wyck, States, Wolverine, Woods Dual Power, Dispatch and Yale. Others whose plans are not definitely announced at this time are Disbrow, Ghent, Madison, Marion-Handley, Monroe, Murray, Nelson and Pennsy. Fergus has been doing Government work and probably will not resume passenger car manufacture at this time. Fiat presumably is awaiting the resumption of something similar to its pre-war arrangements with its home factory in Italy. In all, there are about thirty-three car names which are not among those present at roll-call now.

The names of three new cars make their appearance in the annual specifications this year. These are the Essex, first announced by the Hudson people last May but withheld from production until this week; the Holmes, an air-cooled, which made its debut during the New York show of 1918; and the

INCREASE IN REGISTRATION DEC.
31, 1917, TO DEC. 1, 1918

	Increase	Per Cent
District of Columbia	18,847	89
South Carolina	18,578	50
New Jersey	41,590	48
Arkansas	12,596	44
Georgia	28,664	41
Alabama	13,282	40
Maryland	22,017	39
Kentucky	18,484	39
Oregon	18,475	38
Wyoming	4,149	35
Idaho	7,609	31
Virginia	16,567	30
North Carolina	16,350	29
Washington	26,083	28
Utah	5,978	28
Missouri	39,004	27
Tennessee	13,000	27
Mississippi	8,350	26
Ohio	83,770	25
South Dakota	16,945	25
Delaware	2,411	25
Louisiana	7,705	24
Rhode Island	5,453	22
Michigan	46,166	21
Indiana	37,727	20
Kansas	31,667	20
Oklahoma	20,101	20
Wisconsin	32,313	20
New Mexico	2,817	20
Montana	8,229	20
Florida	7,843	20
California	45,057	18
Nevada	1,227	18
Nebraska	27,269	18
Iowa	49,287	18
West Virginia	5,719	18
Texas	36,749	17
Illinois	48,843	14
Pennsylvania	44,957	14
Massachusetts	21,520	14
Connecticut	10,260	14
Arizona	2,781	14
New York	49,341	13
New Hampshire	2,312	13
North Dakota	7,538	12
Vermont	2,214	12
Maine	3,655	10
Minnesota	9,627	5
Colorado	3,150	5

Total1,004,176 ..
Average for United States. 20



This map represents graphically the distribution of motor vehicles over the country. Each dot represents 1000 registrations and the closeness of the dots indicates the concentration of motors in the various sections

Revere, a Hoosier production which first appeared during the Chicago show of 1918.

We find the list then this year having about thirty fewer cars represented than last year, sixty-five fewer chassis models and 213 fewer body models. Last year there were 180 chassis models as against 115 this year and the 650 body models of last year have dropped to 437. It is to be borne in mind, however, that there will not be the decrease in the number of styles that this would seem to indicate, inasmuch as the low number of styles shown is caused chiefly by the fact that there has not been time since the signing of the armistice to develop a complete program.

It is pertinent here to consider for a moment the possible demand for cars as indicated by the registrations in the different states. Based on the registrations alone, a definite existing need for new production to make up for the lowered output

for the last year is indicated. During the seven years for which accurate data is available there has been a steady gain in registration. In 1916 there was a 50 per cent gain over the year previous. In 1917, a 39 per cent gain, but for 1918 only 20 per cent gain over the preceding year. Consequently, the industry will have to supply not only the normal increase, which probably is in the neighborhood of 40 to 50 per cent, but also the 20 to 30 per cent that was not filled this last year.

The number of motor vehicles in use in the country as shown by the registrations last year is nearly six million, 5,945,442 cars and trucks to be exact. This means one vehicle for every eighteen persons in the United States. There are two states, Iowa and Nebraska, which have one car or truck for each seven persons. This is one vehicle for every one and a half families, on the basis of five to a family.

The Average Price of American Cars

THE price of America's average touring car for 1919 is \$2,128. This is calculated from the prices existing at the beginning of the new year for about 420 different car models. A few of the manufacturers withheld the prices of their cars when sending in their specifications, so the average price of \$2,128 is not based on all the 437 car models which are scheduled. In January, 1910, the average price was \$2,214, according to the price fluctuation curve on these pages. In 1911 the price increased considerably, to \$2,560, and continued to increase, though at a more gradual rate, each succeeding year, until 1915, when the price dropped to \$2,005. This price is the first one that was affected by the world war, and it seems at first thought that a drop in price is the reverse of what might be expected.

The number of makers decreased during 1914, so that at the beginning of 1915 there were fourteen less manufacturers, and the cars they produced were in general high-priced. Factory operations were at that time beginning to receive more attention, methods were simplified, whole processes eliminated and one move made to do as much as two had done before. This also accounts for the decrease in price.

For 1916 the price was still lower, quantity production methods were being installed in wholesale numbers, and a few more high-priced cars were discontinued, which brought the average price to the

lowest value on record, \$1,600. In 1917 the pinch from the shortage of materials was becoming manifest. Despite the fact that thirty new manufacturers were announced, the majority of them making cars selling for less than the average, the price rose to \$1,687.

The average car for 1918 is the first one to feel the reaction due to the entrance of the United States into the war. The abnormal conditions that war creates naturally caused prices to increase. Particularly is this true of the motor car. The materials used in its construction are very essential in war equipment. The shortage of material so caused brought the price of the 1918 car to \$1,822. Nineteen Nineteen must face the same conditions for a while, until the effects of reconstruction and readjustment are felt.

OHIO HOLDS ROAD CONGRESS

Columbus, Ohio, Jan. 17—Many and varied topics were discussed at the second annual Ohio road congress which was held in Columbus last week. The attendance, stimulated by the fact that many of the allied organizations held their annual meetings at the same time, was much larger than last year. After-the-war problems were discussed and many recommendations were made.

A resolution was adopted urging the state authorities, in co-operation with Federal officials, to start the improvement of

sixty-two gaps of roads, ranging in length from 1 to 10 miles. When these gaps are completed they will hook up a total of 2,415 miles of improved roadway in the Buckeye State. It was recommended that the present law be changed to require the highway commission to consider applications for improvements and grant applications in order of their importance to the public.

It was suggested that a law be enacted taxing cars and motor trucks on the basis of horsepower. This suggestion has been offered frequently and has always been defeated. It was suggested that the license fee be 25 cents per horsepower on all motor-driven vehicles.

Fourth-Assistant Postmaster General James I. Blakeslee in addressing the congress said he was in favor of an expenditure of \$30,000,000,000 for road improvement in all parts of the United States.

The congress was participated in by the Ohio Goods Roads Federation, Ohio Postmasters' Association, Ohio County Commissioners' Association, Ohio Engineering Society, Ohio Macadam Association, Ohio Highway Commission, Ohio Automobile Association, Ohio Auto Trade Association, Ohio Sand and Gravel Association, Ohio Portland Cement Association, Ohio Contractors' Association and Ohio State Grange.

A TRUCK TO A COUNTY!

Columbus, Ohio, Jan. 17—The Ohio Association of County Commissioners in session last week asked that the War Department donate one or more army motor trucks to each of the counties in the country to carry on the work of road improvement and for general utility purposes. The resolution pointed out that the trucks were no longer needed by the war department and could be put to excellent use by the various counties.

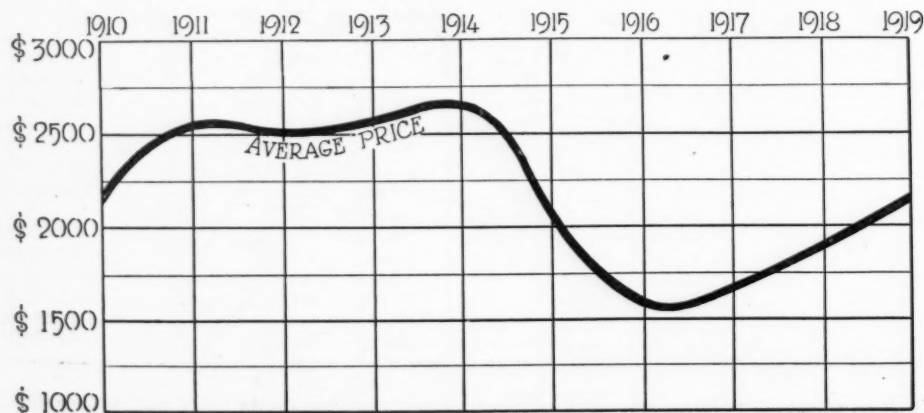
Fourth-Assistant Postmaster General Blakeslee in a talk before the association promised that sixty motor truck mail routes would soon be operated out of Columbus. He said that motor truck routes so far as they have been tried out have proved successful in every way.

AIRCRAFT SHOW POSTPONED

New York, Jan. 21—Special telegram—The aeronautical show to be staged by the Aircraft Manufacturers' Association has been extended from one to two weeks and the date postponed to March 1-15. The number of exhibits has grown to such an extent through the desire of the Army and Navy to place on view their latest types of machines and instruments that the exhibit will be staged in the 69th Regiment armory as well as in Madison Square Garden.

N. A. D. A. ROADS MAN

St. Louis, Jan. 20.—Pike Johnson of Washington, who put over the highway transport movement in Colorado, has been made good roads representative of the N. A. D. A. He is at present engaged in good roads educational work. He will supply any information relative to the good roads movement that may be desired. Dealers should address him through the N. A. D. A. general offices here.



How the average price of American cars has fluctuated since 1910

Show Circuit Opens with Boom This Month

Chicago Heads List—Few Earlier Events

THE motor show season of this year promises to be more widely observed than it ever has been in the past. Instead of being opened by the national exhibitions at New York and Chicago as in the past, the 1919 circuit is featured by the fact that there are no displays promoted by the manufacturers but all are originated by the local dealers' associations.

The Chicago exhibition has national significance in every respect and probably will be as truly a national show as any of the previous exhibitions under national auspices. Not only has it the support of the National Automobile Chamber of Commerce, the organization which has staged previous shows, but it also is sanctioned by the Motor & Accessories Manufacturers' Association, which has moved its annual meeting and banquet to Chicago for show week. The National Automobile Dealers' Association likewise is holding its annual meeting and dinner in the Windy City next week. It also has a convention in New York during the Gotham display.

Thus Chicago is considered as inaugurating the show season. However, there have been three curtain raisers of importance. These are the exhibitions at Los Angeles, Jan. 11 to 18, Dallas, Tex., Jan. 16 to 18, and at Spokane, Wash., Jan. 15 to 18. The Los Angeles affair seems to be an exhibition of almost as great importance on the Pacific Coast as the dealers' shows at New York and other eastern points will be to the Atlantic seaboard.

A census of the show calendar indicates that all sections of the country will be pretty well taken care of from an exhibition standpoint. At this writing, there are forty-seven shows scheduled between this date and April 1. These are set for forty-

one different cities and for all but seven of them definite dates are announced. Data on all these are given in the calendar, page 112.

Chicago, New York, South Bethlehem and Brooklyn are scheduling two-week affairs, one week of which will be devoted to passenger cars and the other to trucks. Kansas City is running two shows simultaneously, one a passenger car and the other a tractor exhibition, promoted by different organizations. The automotive exhibitions, so labeled because they take in all the allied lines of the motor industries such as trucks, tractors, etc., are promised by Louisville, Ky., Des Moines, Ia., Omaha, Neb., in addition to the Los Angeles affair. All in all, it looks to be a most active show season and a program indicative of an active buying season.

Chicago All Set

CHICAGO, Jan. 21—Chicago's Nineteenth Annual Automobile Show, which is to be held at the Coliseum, the Coliseum Annex and First Regiment Armory, Jan. 25-Feb. 6, will be staged in regal colors of purple and gold. For many years the Chicago exhibition has been noted as the most spectacular in the country, not alone in point of actual car displays but in the gorgeousness of its decorations.

A vast canvass top-piece, measuring 300 by 240 ft., will entirely cover the Coliseum ceiling. At one upper end of the Coliseum will be a brilliant transparency depicting the Goddess of Peace receiving Industry, and on the other end another Goddess holding out a motor car to the world. About the uppersides of the vast

building will be great sunbursts having, in the foreground, outlines of the various types of cars. Between the sunbursts will stand the insignia of the Allied nations on shields, and the flags also will be featured, as the Chicago show this winter reflects peace, victory and optimism.

The motor car exhibits will be housed among rows of great pillars of rich mahogany color, standing 23 ft. high. These pillars will be surmounted by white-starred blue globes which, in turn, hold up bronze eagles measuring 8 ft. from tip to tip.

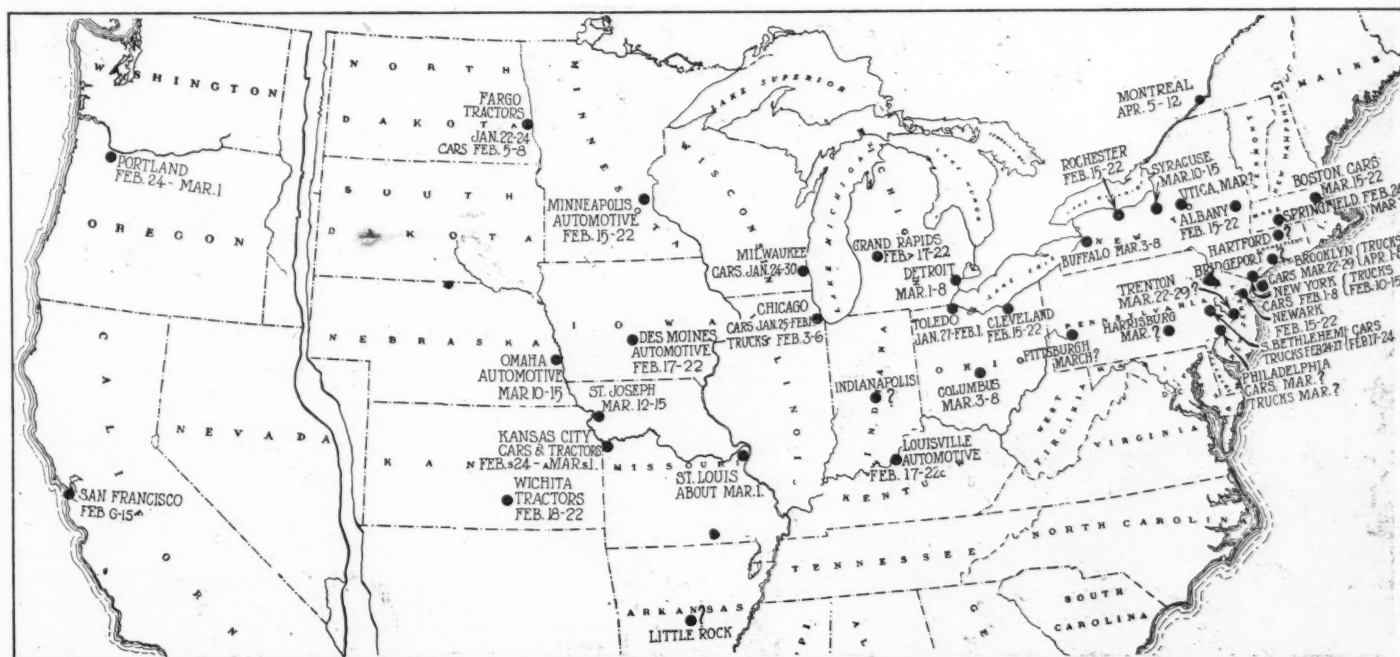
In the Armory the decoration scheme will be similar to that of the Coliseum, except that the statues of the Goddess of Plenty will be featured. The Coliseum Annex decorations will be an unusual conception on the part of Artist C. J. Tietzel, having a Japanese effect.

The passenger car session, listed for Jan. 25-Feb. 1, has sixty-nine car and 130 accessory exhibits. The truck show, the week following, now has forty-three exhibits of trucks and forty-three of accessories.

Makers and Dealers

CHICAGO, Jan. 21—Next week promises to be a busy one for the visiting dealers and manufacturers at the show. In addition to the annual meeting and banquet of the Motor & Accessories' Association and the meeting of the National Automobile Dealers' Association with the annual frolic staged by the Chicago Automobile Trade Association, the Society of Automotive Engineers is planning a professional session and "home-coming supper" at the Morrison the evening of Jan. 30.

This sums up the national organization affairs so far announced, but virtually all



Herewith are represented the shows beginning with Chicago. A few have been held and are not shown. Still others sent in their dates too late to be indicated here and are listed on page 31

the manufacturers have planned conferences of their organizations during passenger-car show week. Among those which have already made arrangements are Maxwell, which expects to have 400 dealers at its session at the Congress hotel. Paige-Detroit will have about 300 at its conference. Franklin and Cole also will be at the Congress and Chevrolet at the Blackstone. Other concerns which have dealer meetings but which have not completed their arrangements are the Elgin, Westcott, Grant, Pierce-Arrow and Velie. The Class Journal Co. will have its annual dinner and meeting during the week.

New York Program

NEW YORK, Jan. 21—The New York dealers have found their show of passenger cars, Feb. 1-8 and trucks, Feb. 10-15, outgrowing the original space available in the Madison Square Garden and 69th Regiment Armory and had to rearrange space in the Armory to provide more exhibits of these. The N. A. D. A. holds a convention in New York during the show and the S. A. E. has its annual meeting at that time. A banquet will be given for Capt. Eddie Rickenbacher Feb. 3 by the A. A. A.

The National Automobile Chamber of Commerce has two meetings scheduled. The first will be devoted to cars, Feb. 5; the second will be devoted to commercial vehicles, Feb. 11.

At present there are fifty-nine passenger car and 141 accessory exhibits for the first week. The show will be staged by the Automobile Dealers' Association of New York.

Madison Square Garden is to have an unusual color scheme arrangement and the treatment of the balconies is ingenious. Projecting from the first balcony around the entire arena will be a roof of Spanish tiles. The tiles will be green and an illu-

minating scheme will be installed beneath this narrow roof. The walls about the main arena floor will have alternate paneling and large mirrors, which will give the effect of greater area, and the portion beneath the balcony will be illuminated with indirect lighting. The color scheme is cream and white, with certain shades of blue. The first balcony rail is paneled in artistic fashion, and a series of forty urns filled with plants and ferns rest upon it at intervals.

A patriotic color scheme is the keynote of the armory decorations. The rear wall of the building will have a sunburst of red, white and blue forming a huge-semi-circle. Between the rows of exhibits will extend a wide arbor effect, with trellised vines and flowers. Cypress trees will form a feature of the decorations.

BIG PLANS AT K. C.

Kansas City, Mo., Jan. 20—Motor car and truck dealers of the West will get together in Kansas City, Feb. 27 during the motor car and tractor show—and the chief subject of the speeches will be good roads. President F. W. A. Vesper of the National Automobile Dealers' Association will speak.

The Kansas City motor car show, at Convention hall the week of Feb. 24, will have

at least 300 exhibits, cars, trucks and accessories, or fifty more than last year.

The national tractor show promises to have vastly increased interest, because of the presence of several thousand motor car dealers attending the motor show, many of whom will here make contracts, or perfect plans, for handling tractors.

ST. LOUIS SHOW LOCATED

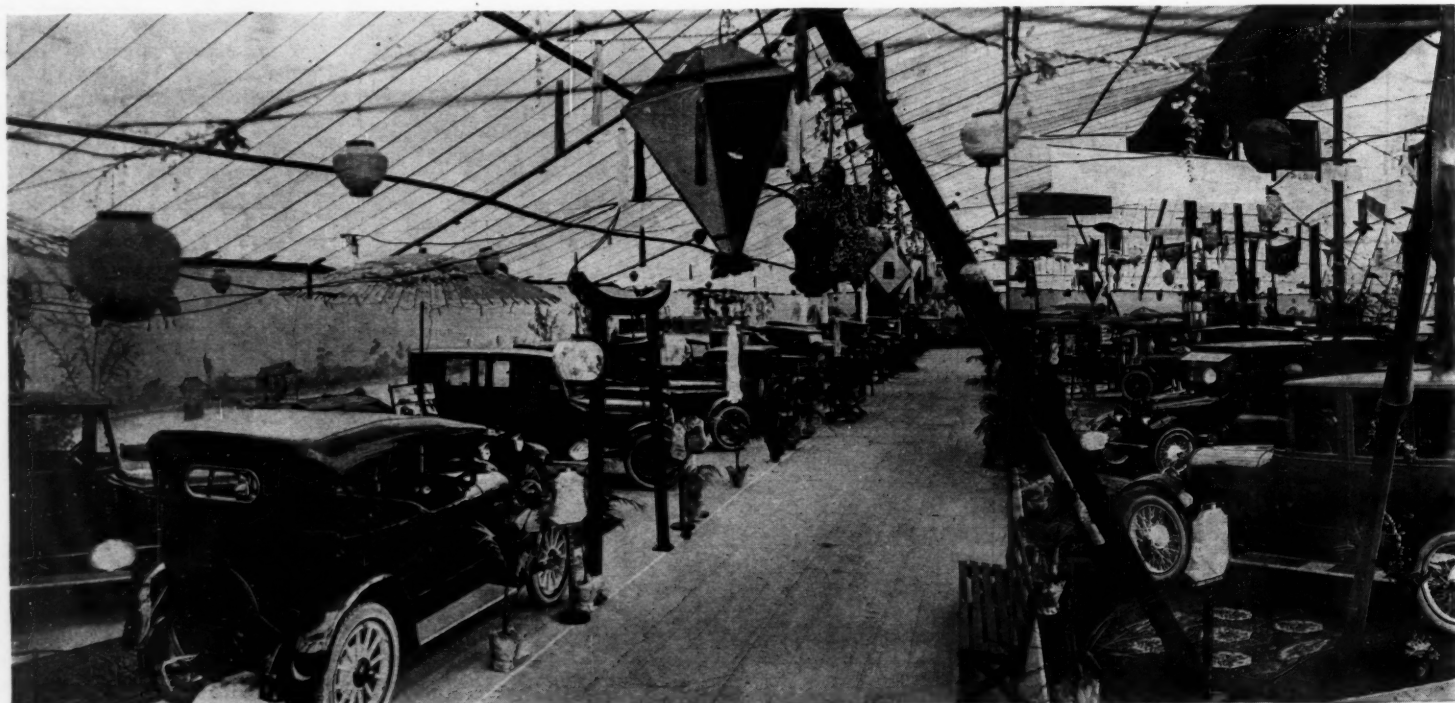
St. Louis, Mo., Jan. 20—The St. Louis show will be held Feb. 17-22 in the Exhibit building, formerly the Southern hotel. This building housed the last show but for the affair this year all partitions on the second floor, where once were guest rooms and parlors, will be removed and a concrete floor will be completed in time for the show.

The drawing for show spaces will be held on Friday of this week. Only passenger cars and accessories will be exhibited, but space on the first floor has been allotted to truck dealers and arrangements made for the installation of desks and illustrated matter. The plan is for truck dealers to meet any interested person there. It has not been possible to arrange for truck exhibits in the space available and the truck men did not want a separate exhibit.

Exhibitors for Chicago Show

PASSENGER CARS

Apperson, Armory.....	A-7	Commonwealth, Armory.....	E-2
Auburn, Armory.....	E-3	Cadillac, Coliseum.....	D-3
Allen, Armory.....	C-2	Detroit, Coliseum.....	A-8
Biddle, Armory.....	C-1	Dorris, Coliseum.....	C-3
Briscoe, Coliseum.....	A-5	Daniels, Annex.....	Q-3
Buick, Coliseum.....	C-5	Dodge, Coliseum.....	B-2
Baker, R. & L., Armory.....	A-4	Davis, Armory.....	A-5
Case, Armory.....	B-3	Dort, Coliseum.....	F-4
Chevrolet, Coliseum.....	D-5	Elgin, Annex.....	O-2
Cunningham, Armory.....	B-6	Elcar, Armory.....	E-1
Cole, Coliseum.....	F-3	Essex, Annex.....	Q-2
Chandler, Coliseum.....	A-2	F. I. A. T., Armory.....	B-4
Chalmers, Coliseum.....	B-5	Franklin, Coliseum.....	A-3



Oriental decorations transformed the huge tents used by the Los Angeles dealers for their show that closed Saturday.

Ford, Armory.....	C-4
Grant, Coliseum.....	E-1
Hudson, Coliseum.....	B-4
Haynes, Coliseum.....	D-6
Holmes, Annex.....	N-1
Hupmobile, Coliseum.....	D-4
Jordan, Annex.....	P-1
Kissel Kar, Coliseum.....	F-2
King, Armory.....	B-1
Liberty, Annex.....	O-1
Lexington, Coliseum.....	J-1
Locomobile, Armory.....	B-1
McFarlan, Armory.....	B-7
Marmon, Coliseum.....	C-4
Maxwell, Coliseum.....	B-6
Milburn, Armory.....	A-6
Mitchell, Coliseum.....	K-1
Moline, Coliseum.....	G-2
Mercer, Coliseum.....	B-1
National, Coliseum.....	B-3
Nash, Coliseum.....	A-1
Oldsmobile, Coliseum.....	D-2
Owen-Magnetic, Armory.....	A-2
Oakland, Coliseum.....	C-6
Overland, Coliseum.....	D-1
Paige, Coliseum.....	A-4
Premier, Coliseum.....	E-3
Peerless, Armory.....	A-1
Packard, Coliseum.....	C-1
Pierce-Arrow, Coliseum.....	C-2
Patterson, Annex.....	Q-1
Reo, Coliseum.....	C-3
Roamer, Armory.....	B-2
Saxon, Armory.....	C-5
Standard, Armory.....	A-3
Studebaker, Coliseum.....	A-6
Stutz, Annex.....	M-1
Scripps-Booth, Coliseum.....	E-4
Stephens, Coliseum.....	H-1
Stearns, Coliseum.....	G-1
Vellie, Coliseum.....	E-2
Westcott, Coliseum.....	H-2
Winton, Coliseum.....	F-1

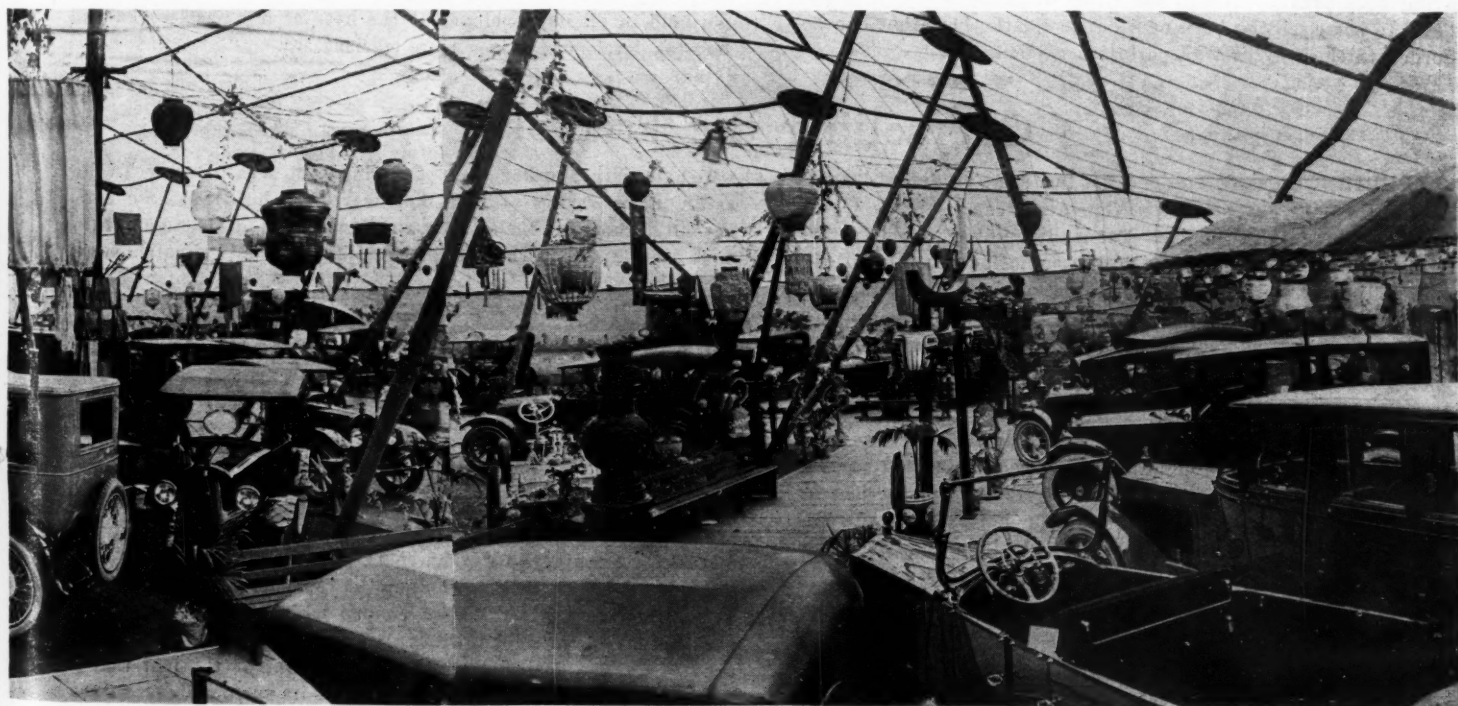
ACCESSORIES

Ahlberg Bearing Co., Chicago, Coliseum....	78
Alemite Die Casting & Mfg. Co., Chicago, Coliseum.....	18
Amazon Rubber Co., Akron, Ohio, Coliseum.....	98
American Bronze Corp., Berwyn, Pa., Coliseum.....	51
Anderson Electric Specialty Co., Chicago, Annex.....	106

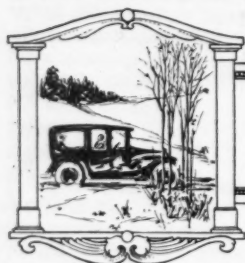
Anderson Forge & Machine Co., Detroit, Coliseum.....	47
Arrow Grip Mfg. Co., Glens Falls, N. Y., Coliseum.....	86
Auto Cape Top Co., Inc., Chicago, Annex.....	100-102
Auto Indicator Co., Chicago, Annex.....	108
Automobile Journal Publishing Co., Pawtucket, R. I., Annex.....	151-152
Auto Parts Co. of America, Chicago, Annex.....	188-189
Bailey Drake Co., Chicago, Coliseum.....	91
Barnes & Miller, Chicago, Coliseum.....	6
Becker Bros., Chicago, Coliseum.....	50
Bell Tire & Rubber Co., Chicago, Annex.....	203-204
Black & Decker Mfg. Co., Chicago, Coliseum.....	91
Bosch Magneto Co., New York, Coliseum.....	28-31
Buda Co., Harvey, Ill., Coliseum.....	33-34
Buell Mfg. Co., Chicago, Annex.....	107
Buffalo Specialty Co., Buffalo, N. Y., Coliseum.....	87
Bovey Auto Heater Mfg. Co., Chicago, Coliseum.....	5
Carlisle Tire & Rubber Co., Carlisle, Pa., Annex.....	192-193
Challoner Co., Oshkosh, Wis., Coliseum.....	72
Champion Ignition Co., Flint, Mich., Coliseum.....	64-65
Champion Mfg. Co., Chicago, Armory.....	37
Chicago Coach & Carriage Co., Chicago, Coliseum.....	21
Chilton Co., Philadelphia, Pa., Coliseum.....	8
Clark Equipment Co., Buchanan, Mich., Coliseum.....	45-46
Class Journal Co., Chicago, Coliseum.....	2-3
Cochran Pipe Wrench Mfg. Co., Chicago, Annex.....	211
Cole Storage Battery Co., Chicago, Annex.....	212
Corbin Screw Corp., New Britain, Conn., Coliseum.....	85
Dafae Eustice Co., Detroit, Armory.....	38
Detroit Pressed Steel Co., Detroit, Coliseum.....	26-27
Dixon, Jos., Crucible Co., Jersey City, N. J., Coliseum.....	61 & 68
Eastern Rubber Co., Philadelphia, Pa., Coliseum.....	15
Eclipse Machine Co., Elmira, N. Y., Coliseum.....	48
Eisemann Magneto Co., Brooklyn, N. Y., Coliseum.....	81-82
Electric Storage Battery Co., Chicago, Coliseum.....	42-43
Empire Mfg. Co., Binghamton, N. Y., Annex.....	121-122

Essenkay Products Co., Chicago, Annex.....	205-208
Flash Sales Corp., Chicago, Coliseum.....	11
Gabriel Mfg. Co., Cleveland, Ohio, Coliseum.....	52
Gates Co., Chicago, Annex.....	177
Globe Mfg. Co., Battle Creek, Mich., Coliseum.....	89
Graff Mfg. Co., Chicago, Armory.....	E-4
Grant, R. J., & Sons, Rubber Co., Milwaukee, Wis., Coliseum.....	99
Gray & Davis, Inc., Boston, Mass., Coliseum.....	56 & 73
Gray Heath Co., Chicago, Annex.....	159-165
Hartford, Edw. V., Inc., Jersey City, N. J., Coliseum.....	62
Hassler, Robert H., Inc., Indianapolis, Ind., Annex.....	103
Hercules Buggy Co., Evansville, Ind., Annex.....	168-172
Holland Brass Works, Chicago, Annex.....	194-195
Hummer Vehicle Works, Chicago Heights, Ill., Coliseum.....	36
Ideal Tire & Rubber Co., Cleveland, Ohio, Coliseum.....	94
Imperial Brass Mfg. Co., Chicago, Coliseum.....	90
Inland Machine Works, St. Louis, Mo., Annex.....	141-142
Jefferson Elec. Mfg. Co., Chicago, Annex.....	153-156
Jessup & Thompson, Chicago, Armory.....	39
Johnson Auto Lock Co., Chicago, Annex.....	175
Johnston, Wm. R., Mfg. Co., Chicago, Coliseum.....	19-20
Kales Stamping Co., Detroit, Coliseum.....	71
Kent, Atwater Mfg. Works, Philadelphia, Pa., Coliseum.....	13 & 23
Lane Bros., Poughkeepsie, N. Y., Coliseum.....	95
Lipman Pump Works, Beloit, Wis., Annex.....	104-105
Marmon Chicago Co., Chicago, Coliseum.....	84
Marvel Machinery Co., Minneapolis, Minn., Armory.....	4
Mechanical Belt Co., St. Joseph, Mo., Annex.....	209
Mitchell Bynon Co., Chicago, Coliseum.....	97
Monarch Auto Lock Co., Chicago, Coliseum.....	7
Morand Bros., Chicago, Annex.....	149-150
Moto-Meter Co., Inc., Long Island City, L. I., Coliseum.....	63
Motor, Chicago, Annex.....	176
Motor Vehicle Publishing Co., New York, Coliseum.....	10
Motor & Accessory Mfg. Assn., New York, Coliseum.....	77
National Carbon Co., Cleveland, Ohio, Coliseum.....	74

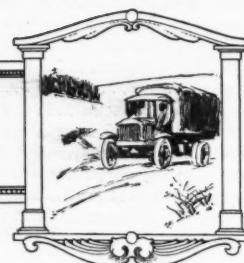
(Concluded on page 31)



The exhibition was the most gorgeous the western coast has ever had. Other details will be given next week



EDITORIAL



Good Workmanship Pays

EXPERIENCE of manufacturers of motor cars and component parts during the last three or four years will be found to have created a situation which will be of immense benefit both to dealers and owners as well as to the manufacturers themselves. This is a realization of the fact that the addition of a few dollars to the cost of manufacture may save several times that amount on the service department account. It does not need to be stated here that some manufacturers of low-priced and medium-priced cars who cut prices a little too enthusiastically in 1915 and then revised factory costs in proportion found that their economies did not always figure out on the profit side of the ledger.

It is cheaper to make a good piece of work in the first instance than to do a poor one and have to mend it at a later date. But the last few years have shown many manufacturers just about how far they can cut manufacturing costs safely because they have gone to the limit and in some instances have passed the limit. Those who are beginning to realize the fact that too great a cheapening of production means not only loss in good will but in the service account this year will be found less eager to substitute a cheap material or method whose staying qualities are problematical.

Comfort Plus Economy

ALL in all, this is a year in which we can skim the cream from a past development and can look forward with a great amount of interest to what is to come. What we have is tried and true, having been proven through the stress of years of trial. What is still to come will be born of a desire for the best that can be afforded in the way of transportation efficiency.

On With the Shows

THE show circuit proper opens with the Chicago exhibition at 2 o'clock next Saturday afternoon. This is almost a month later than usual, for before this the show season has been inaugurated with the national show at New York immediately after New Year's. But this is a year of new conditions. These new conditions are reflected in the shows as in no other one way, perhaps. Although not a national show, the Chicago show has a national significance never held before, as pointed out in the first article of this issue, and the shows which come after also will have a national significance.

NEW YORK follows, immediately after Chicago's show, with its exhibition. The circuit is a wide one, covering the whole country. Each week MOTOR AGE adds to its calendar of coming shows. No town is too small and no dealer organization too weak in the number of members to stage a like event. And they are doing it, all the way from the two first cities, Chicago and New York, down the line. This is good. In the show the dealer will find that means he has been seeking for awakening the demand that he has made dormant by months of patriotic war economies and what not. It is fitting that the dealers of the nation should be gathering at Chicago during the show and that the makers are planning meetings for that time.

Overselling the Tractor

EXPERIENCE has determined the fact that no definite statement of the cost of tractor operation can be made which shall be universally applicable. Too many and too varied factors are involved to make an accurate determination possible. Dealers in selling tractors will do well to bear this fact in mind. If they do they are likely to make the most fatal mistake which a dealer can commit, namely, oversell his machine.

MANY think that overselling a tractor consists merely in overstating its capacity for work. This is done very commonly, it is true. But to make unwarranted statements regarding the cost of tractor operation is to oversell a tractor just as surely as it is to assert that it will pull four bottoms when it will pull only three. The ultimate effect upon the individual customer and upon the trade in general is equally bad in both cases.

D R. W. E. TAYLOR, than whom there is perhaps no better authority on agricultural operations, says that wherever a tractor can be used advantageously at all, it will reduce the cost of farming and will increase production. Prof. F. W. Peck says the tractor increases the efficiency of the man power on the farm,

WE want to take to heart and to keep the lessons in economy that we have learned during the war. It is not necessary to divorce this economy from comfort. The position of the motor car to-day is typical of the position of all the American industry. We hold in all its development the best of our past works and look for developments in a more efficient era.

which is only another way of saying just what Doctor Taylor said. It is worthy of note, however, that both of these competent authorities insist that the tractor, in order to do this, must be adapted to the conditions under which it is called upon to work.

IT will be noted that these are both general statements. Nor do they imply that a tractor always is or can be operated economically. The conditions precedent to economical use of a tractor are favorable conditions on the farm and fitness of the tractor to meet these conditions. When the dealer knows his locality and uses discretion in the selection of the tractor he sells, he safely can assure his customers that the tractor will prove to be satisfactory upon any comparison between the costs of tractor farming and of horse farming. But the dealer who is more specific than this, who has the temerity to talk in actual dollars and cents, is taking a chance which is unwarranted in the present stage of knowledge regarding the cost of tractor operation. The dealer should never lose sight of the fact that a tractor does not operate independently of its surroundings, so the cost varies according to the extent to which tractor and conditions are suited.

Packard Adds Planes

Detroit Concern First to Market Aircraft Through Its Distributors

First Order Is Booked by Chicago Branch

DETROIT, Jan. 20—Special telegram—The entrance of the motor car manufacturers into the commercial production of aircraft which has been predicted as a result of their wartime activity in plane building has become an actuality sooner than was generally anticipated. The announcement of the Packard company that it will market a two-passenger biplane for about \$15,000, this to be sold through its dealer organization, opens up a new field to the motor car dealer. Packard's announcement was made after a recent dealers' meeting at which the marketing of planes was discussed.

One order already has been received by the Chicago branch from a Milwaukee man. Dealers are enthusiastic, believing that there will be a call for planes for wealthy sportsmen in all large centers. The first planes will be ready for shipment in a month.

DEALERS TAKE ON PLANES

Milwaukee, Wis., Jan. 20—A new epoch in the automotive dealer industry of Milwaukee has opened with the announcements of two leading members of the trade that they have concluded arrangements for dealing in aircraft on a commercial basis. George W. Browne has been appointed exclusive distributor of the Curtiss airplane in Illinois, Indiana, Wisconsin, Iowa and Minnesota. Lieutenant Gilles E. Meisenheimer, Royal Flying Corps, has accepted the position of chief instructor and demonstrator of the new aircraft department.

At the same time, Ray C. Chidester, manager of the Milwaukee branch of the Packard Motor Car Co. of Chicago, announces that the branch will engage actively in the distribution and sale of the new commercial airplane which will be manufactured by the Packard company under the direction of LePierre. Mr. Chidester exhibits his first airplane sales contract, made with F. C. McFetridge, a capitalist of Baraboo, Wis., who was among the first motor car owners of this state.

SPEED IN JOBBERS' TRIAL

New York, Jan. 20—The trial of twenty-one members of the jobbers' association is showing a little more interest and speed this week than it did last week. It opened last week with George Woelfel, Jr., Commissioner Webster's former secretary, on the stand and the various prosecuting attorneys reading great masses of documentary evidence.

In the opening days the jobbers were quite encouraged when Judge Hand, who is an old timer in the United States district court here, showed a disposition to speed things up. He repeatedly asked if it were necessary to bring in all the masses of documents the Government attorneys pre-

sented, and when one of them proposed to read some 1400 letters into the record the judge flatly refused to listen to them. He also jogged the defense at times and seems anxious to get the case over. Estimates of the period run from a month to six weeks.

The first on the slate this morning was G. A. Smale, who operates the Catalog System Co. in Wilmette, Ill. He told of the association's resolution which frowns on the use of syndicate catalogs. The substance of his story was that he protested against this resolution to various individuals and at two different meetings but to no avail. He said also that thereafter quite a long list of former customers declined to take space in his catalogs, giving as an excuse the association's resolution.

The cross examination by the association's counsel tended to show that Mr. Smale showed only those goods whose makers paid him money for space, that he did little investigating as to the status of those who bought space and catalogs, then sold the catalogs, imprinted with the buyer's name, to anyone who would pay for them, that he imprinted on the front cover any copy the buyer supplied and that this tended to cause many "illegitimates" to secure jobbing rates on merchandise to the general disadvantage of the whole trade. These catalogs, it was developed, did not contain a complete list of the trade goods but simply a list of the goods of those makers who paid to get in. This fact, however, was not as a rule explained to those dealers and jobbers who bought the catalog for use among their trade.

Then came Clement M. Biddle of "Biddle's Purchasing Agency." He said his company rendered a service in giving daily price changes and other information and catered to the jobbers in the hardware, iron, steel, plumbing supplies, grocery, metals and automotive equipment trade. Mr. Biddle's story related to the association's resolution to the effect that there is no field in this trade for a purchasing agency, and he endeavored to show that his business is of service and that the resolution is unjust. Asked if he had had an encounter with the association, he said no but that he had had a "private fight with Webster."

TAYLOR WITH HOLT PLANT

Peoria, Ill., Jan. 18—Sutherland G. Taylor, Jr., has been appointed export manager of the Holt Mfg. Co., effective Jan. 1. Mr. Taylor has within a month received his discharge from the Army, where as a lieutenant of ordnance he served as assistant to Major Carlisle, Chief of the Motor Equipment Section, Procurement Division.

LATEST ON PRICES

Pontiac, Mich., Jan. 17—The General Motors Truck Co. has lowered the price of its $\frac{3}{4}$ -ton truck, model 16, from \$1,775 to \$1,495, a reduction of \$280.

Detroit, Jan. 17—The Hupp Motor Car Corp. has reduced the prices of its touring car and roadster from \$1,500 to \$1,335, effective Jan. 7. Return of production to a quantity scale is given as the reason for the change, although the company expects labor and materials to remain at their present high-cost level for some time to come.

Liberty Fuel Analyzed

Supply Would Depend on Available Benzol, Which Is Chief Constituent

Amount Only 2 Per Cent of Total Gasoline

WASHINGTON, Jan. 17—Liberty Fuel, which was first announced in these columns and which is said by the inventor, Capt. E. C. Weisgerber, to be a substitute for gasoline, has been tested by the Fuel Administration, and, according to the Administration, this fuel is 65 per cent benzol, 25 per cent kerosene and the remainder a small percentage of amyl acetate and and naphthalene and alcohol, together with some quantities of dissolved solids.

On this analysis, it was pointed out, the available supply of the fuel must depend on the available supply of benzol, its chief constituent. Investigation in this direction showed that if the total production of benzol—3500 bbl. a day—were so used, the total production of Liberty fuel would be about 2 per cent of the present output of gasoline, which is approximately 90,000,000 bbl. a year. Benzol, however, has other uses, notably in grease extraction and as a solvent for rubber.

Might Plug Carbureters

A gumming and corrosion test, also conducted in the aeronautic laboratories of the Army, showed no perceptible corrosion, but "a tremendous amount of gumming, that is, 0.4 per cent, accompanied by extensive fuming and penetrating odor." The tendency of the gummy residue in the fuel would be to plug up carbureters, Fuel Administration experts said.

In the same Army laboratory test, crystallization was found to set in at 18 deg. Fahr. and to be "practically complete" at 15 deg. Fahr. Boiling started at 175 deg. Fahr. as against an initial boiling point of not more than 140 deg. for motor gasoline, indicating better starting qualities for motor gasoline.

The Bureau of Standards stated, "The results of test in an aviation engine indicated that 'Liberty fuel,' compared with gasoline fulfilling the export specifications for aviation gasoline will, when consuming 10 per cent greater weight of fuel per horsepower hour, develop about 3 per cent greater horsepower. The (spark) plug used in 'Liberty fuel' showed a slightly greater carbon deposit than the plugs used in the run of export gasoline."

Information furnished the Fuel Administration by the Navy Department stated that a flight of 40 min. was made with the fuel and that "no observations were made which show that the fuel would accomplish any other results than to operate the engine in a manner similar to the aviation fuel which had been used." Arrangements were made, the Navy Department reported, for sufficient quantities of the fuel to make full tests, but the fuel was not supplied. The Bureau of Mines could not get the formula and dropped the matter.

State Roads May Get War Materials

Joint Resolution Authorizing Transfer from War Department Is Pending

WASHINGTON, Jan. 17—The Senate Committee on Postoffice and Post Roads, which deals with all congressional highways legislation, declared this week that there must be no let up in road construction, due to the need of roads for food distribution. Three measures are pending before Congress on highways, matters which are designed to increase the national highways mileage and to improve those roads now in existence, as follows:

A JOINT RESOLUTION AUTHORIZING THE TRANSFER FROM THE WAR DEPARTMENT TO THE DEPARTMENT OF AGRICULTURE OF ALL AVAILABLE DISPENSABLE AND SUITABLE WAR MATERIAL FOR DISTRIBUTION TO THE HIGHWAY DEPARTMENTS OF THE SEVERAL STATES FOR USE ON THE HIGHWAYS.

A Senate bill, increasing the present unexpended appropriation of about \$60,000,000 for road purposes by the addition of \$125,000,000 for expenditures to June, 1920, and \$100,000,000 a year thereafter for four years. It also is proposed to increase the appropriation for national forest roads of \$1,000,000 a year on the present ten-year road-building program by a sum sufficient to construct 17,000 miles of forest roads, which the Government already has planned and which are necessary to utilize the vast resources of the national forests. The estimated cost of these roads is \$50,000,000.

House bill carrying an appropriation of \$1,000,000 for an extension of motor-truck parcels post service. This is an increase from the \$300,000 provided in the last post-office appropriation bill, which also authorized the War Department to transfer to the Postoffice Department motor trucks for which it had no further use. Under last year's appropriation twenty-seven motor truck routes were established, all but one of which were operated east of the Mississippi river.

The first Senate bill has the approval of President Wilson and Secretaries Houston and Baker.

MUTUAL TRUCK ENTERS FIELD

Sullivan, Ind., Jan. 21—One of the most recent entries into the truck industry is that of the Mutual Truck Co., which will build a complete line consisting of 2, 3½ and 5-ton units. Electric lighting and metal wheels are part of the equipment. The officers are Robert E. Petrie, president; Roy O. Anderson, vice-president; Frank McCoy, secretary.

President Petrie states that the concern is getting into production and will exhibit a chassis at the Chicago truck show.

HANCH TO GO ABROAD

South Bend, Ind., Jan. 18—C. C. Hanch, treasurer of the Studebaker Corp., who was called to Washington during the war as chief of the Automotive Products Section of the War Industry Board, has been dele-

gated by the National Automobile Chamber of Commerce to visit Europe to study industrial conditions in connection with the up-building of the export trade of American motor manufacturers. Mr. Hanch will represent this country in Paris at a meeting of the chamber of motor car constructors to discuss customs rates and other questions of International trade importance. Delegates will be present from England, France, Italy, Belgium and other countries.

JOBBER MEET JUNE 2-6

Chicago, Jan. 20—The Automotive Equipment Association, the jobbers' association with its new name, will hold its next meeting June 2-6 at the Homestead Hotel, Hot Springs, Va. June 2-3 will be taken up with meetings of committees and the directors. The general sessions will be held June 4-6.

ROAD MEETING JAN. 27

Chicago, Jan. 20—Governor Frank O. Lowden and the superintendent of highways, S. E. Bradt, will address the convention of the Illinois State Automobile Association at the Lexington hotel here next Monday.

PARIS TO LONDON BY AIR

London, Jan. 17—A regular aerial passenger service is to be inaugurated between here and Paris Monday. Several planes have been prepared for the service. Each has a cabin for two passengers, with cushion seats and a table, entirely inclosed with glass. The trip will take 2 hr. The service is to be operated in connection with the peace conference.

HAWKINS LEAVES FORD

Detroit, Jan. 17—Norval A. Hawkins, for ten years sales manager of the Ford Motor Co., has resigned to give all his time to his own interests.

Under Mr. Hawkins' administration of the sales department, the large output of the company was always kept oversold, the number of sales and assembly plants increasing from eight to eight-six and the dealer organization from a few hundred to nearly 11,000.

WESTERN RETAIL DEALERS MEET

Kansas City, Mo., Jan. 17—The thirtieth annual convention of the Western Retail Implement, Vehicle and Hardware Association, which closed here to-day, was attended more largely by members of the association than was any previous convention. Aside from this fact, and the benefit it may have been to the visitors to see the exhibits of farm operative equipment at the implement jobbing houses on the West Bottoms, the displays in Convention Hall and the booths in the Coates House, it is doubtful if any will have occasion to remember the event with profit. The con-

vention sessions were devoted largely to matters of no business interest to implement dealers, and the convention adjourned with very little of moment accomplished. The movement for good roads was endorsed and the date for National Farm Equipment Repair Week, March 3-8, was approved.

BRUCE DANIELS JOINS SEEDS

Indianapolis, Ind., Jan. 20—Bruce Daniels, in charge of advertising for the Prest-O-Lite Co., has resigned that position to join the staff of the Russel M. Seeds Co., an advertising agency. Mr. Daniels brings to the Seeds' organization a fund of valuable sales and advertising experience. For the last eight years he has been closely identified with the motor industry. Originally motor car editor of the Indianapolis Star, he has successively been in charge of advertising for the Motor Car Mfg. Co., the Stutz Co., and, for the last five years, Prest-O-Lite.

1000 FORDS DAILY

Detroit, Jan. 20—The Ford Motor Car Co. is producing 1000 cars daily but before it can commence upon its 1919 production schedule, which calls for 3000 cars a day, over \$1,000,000 worth of machinery installed for war work must be removed, replaced or scrapped and several buildings readjusted to handle peace instead of war production. The big plant is working night and day on reconstruction work but officials avert it will be ninety days before production can regain its pre-war level.

The Ford fiscal year ends July 1. Because of delay caused by the necessity of readjustment, the company does not expect to make more than 300,000 cars between January and July. The company has enough orders ahead to keep the plant in operation nearly two years.

RACING SCHEDULE FOR 1919

Chicago, Jan. 20—The speedway managers met in New York last week and laid out a tentative racing schedule for 1919, beginning with a meet in Los Angeles under A. A. A. sanction Jan. 26. The next date is Uniontown, Pa., May 17, probably for 112½ miles. Indianapolis comes next, May 31, with its 500-mile event for a purse of \$50,000, and the next date is July 5, at Cincinnati, Ohio.

ANOTHER INDIANAPOLIS ENTRY

Indianapolis, Ind., Jan. 20—Ralph Mulford has signed up to drive a Frontenac in the 500-mile race here May 31. Mulford has been chief inspector of engine work for Wright-Martin during the war. This is the second entry, that of Cliff Durant being the other.

CARS CAN BE IMPORTED

Washington, Jan. 17—The Government restrictions on the importation of agricultural implements, which includes farm tractors, were removed Dec. 24. Dec. 19 the Government restrictions on the importation of cars, carriages and other vehicles, including motor cars and trucks, also were removed.

Many export limitations have been lifted.

It is understood that motor car, truck, accessory and exporters have no difficulty in shipping to South America, or to Spain. Permits from the Danish government must still be obtained when making shipment to Denmark.

The embargo prohibiting the importation of motor vehicles into England, France and Italy has not yet been lifted, so that no space is obtainable for such vehicles on outgoing steamers to those ports, although some accessories are being shipped. The necessity of procuring export licenses from the Shipping Board is still in effect.

TAXES IN REVENUE BILL

Washington, Jan. 17—The Revenue Bill again includes a tax on motor trucks, trailers and parts, this time the tax amounting to 3 per cent of the sales prices. The tax was again included in the bill by the House-Senate Joint Committee following its elimination by the Senate Committee. As the Revenue Bill now stands it contains a 5 per cent tax on passenger cars and parts and accessories and a 3 per cent tax on motor trucks, trailers and parts, these taxes being based on the sales price.

SOUTH DAKOTA MEETING

Sioux Falls, S. D., Jan. 17—The twentieth annual convention of the South Dakota Retail Implement Dealers' Association, which closed a four-day session here to-day, went on record as endorsing the movement for the building of permanent highways and recommended to the legislature the early passage of a bill providing for the financing, building and maintaining of permanent roads throughout the state.

The present practice of wholesale concerns in demanding cash deposits with contracts and the shipment of repair parts C. O. D. was condemned and a better discount on tractors, trucks and repairs was demanded.

Officers were elected as follows: President, J. M. Muggli, Ramona; vice-president, E. B. Raesley, Carthage; treasurer, E. C. Barton, Vermillion.

DOBLE CAR IN FRANCE

Detroit, Jan. 20—The Doble-Detroit Steam Motors Co. has closed a deal whereby their car will be placed on the European market by the Society of Francais Doble, Paris, and the Detroit plant is about to ship its first completed machine to France. The French company is given the exclusive manufacturing and sales rights in France.

Henry Chevalier, formerly in charge of the Russian Renault Co., as director of technic, has returned to Paris after spending several months in Detroit, testing the car and studying manufacturing details. Paul Sicault, for several years with the Renault company in both France and Russia, is general manager of the Francais-Doble plant.

Work on the Doble-Detroit steam car was well underway when war halted operations. During the war period the company developed and devoted its time to the manufacture and sale of a kerosene heating plant for houses, applying the same combustion system used in its car to home heating. With the conclusion of hostilities, the company is shifting back to car manufacture.

Finishing Odds and Ends of War Work

Car Makers Look Toward Reorganization of Sales Forces for Peace

DETROIT, Dec. 17—Manufacturers in this district are congratulating themselves, or otherwise, depending on their ability to get out of war work and back into their customary peace lines. Shell contracts and other ordnance work is not being canceled as rapidly as the work for the Bureau of Aircraft Production. The quartermasters' supplies also are being manufactured with scarcely any sign of a decrease.

While finishing up the odds and ends of war contracts, manufacturers are engaged seriously in an endeavor to rebuild their somewhat shattered sales organizations. The service departments of their dealers have been hit even harder than the sales departments, and to get both of them back on a somewhat normal basis is proving a tremendous task. The report which seems to have circulated in some localities that dealers throughout the country are overstocked is not true. Both in the high-priced and low-priced lines, the dealer has not enough cars to meet the present demand, even though that demand is by no means up to normal.

Manufacturers are unanimous in the opinion that the situation will break in the spring and that there will be a rush of retail buying at that time. This, of course, means that the present is none too early to formulate a dealer organization which will be sufficient to cope with the buying situation. To secure dealers means that deliveries must be promised, and this in turn means that the manufacturing facilities of the plant must be released from Government work. This is easy in some cases and impossible in others.

Manufacturers like Cadillac and Dodge Brothers, whose plants were undisturbed by war work because the Government took their commercial product practically as it stood, are in an extremely fortunate position. There are quite a few others who are also able to turn their plants directly into peace work without an internal reorganization. The plants in this situation simply are going ahead with their pre-war plans as if they had never been interrupted.

A LINCOLN EIGHT-CYLINDER?

Detroit, Jan. 17—Although officials of the Lincoln Motors Co. are steadfast in their determination to keep the future plans of their company well in the dark, a well-defined and semi-authentic report current of late in automotive circles is to the effect that the big plant is being prepared for the manufacture of an eight-cylinder motor car.

What the Leland brothers, of Cadillac fame, were going to do with their huge establishment built at the start of the war for the production on Liberty engines has been an unanswerable question, and an official announcement of policy is awaited with keen anticipation.

The veil of secrecy was somewhat torn recently, it is said, when W. C. Leland let

the cat out of the bag by intimating to business acquaintances a plan to place a new car on the market within the next eight months or a year.

It is understood engineers are working on engine plans and that a set of blue prints already has been completed. The big Lincoln plant had a \$60,000,000 contract for 16,000 Liberty engines. This contract, partly filled, was superseded recently by another contract, cutting production to a minimum, which will bring operation almost to a standstill within the course of the next few weeks. Approximately 4000 men then will be laid off.

BAKER JOINS HYATT

Detroit, Jan. 18—L. M. Baker, formerly sales manager for the United Motors Service, Inc., has been appointed special sales engineer for the Hyatt Roller Bearing Co.

FORD PARTS FROM DEALERS

Detroit, Jan. 20—In selling Ford parts to garages, the Ford Motor Co. is handling this through its authorized dealers and not from the factory or factory branch. Announcement of the plan of the Ford Motor Co. to sell its parts directly to garages has created inquiries and orders to the factory direct. The company, however, states that it prefers that the sale of Ford parts be handled through its regular authorized dealers to the garages instead of being shipped direct from the nearest branch.

In case of doubt, the Ford Motor Co. will advise the garage the nearest dealer through which he can secure his parts, and orders are to be placed in this way instead of through the factory or factory branch.

ELGIN STOCKHOLDERS MEET

Chicago, Jan. 17—About 1000 were present at the annual stockholders' meeting of the Elgin Motor Car Corp. Tuesday. The old board of directors was re-elected, with the exception of A. L. Tull, who resigned. His place was taken by William McMassters, industrial agent of the Indiana Harbor Belt Railway Co. The following directors were re-elected: C. S. Rieman, Gregory L. Baum, W. C. Knoedler, J. M. Smitzler and David Schnitzer. The meeting was a harmonious one throughout and the stockholders passed a resolution of thanks to the management for the satisfactory manner in which the company had been brought through the difficult war period. The report is said to show that the company is to-day in stronger financial condition than it has ever been before.

CROW-ELKHART SETTLEMENT

Elkhart, Ind., Jan. 18—Representatives of the Crow-Elkhart Motor Car Co. practically decided to accept a settlement proposition of 25 cents on the dollar. It was decided to wait a time before definitely accepting the proposition. The total liabilities of the company are \$330,000.

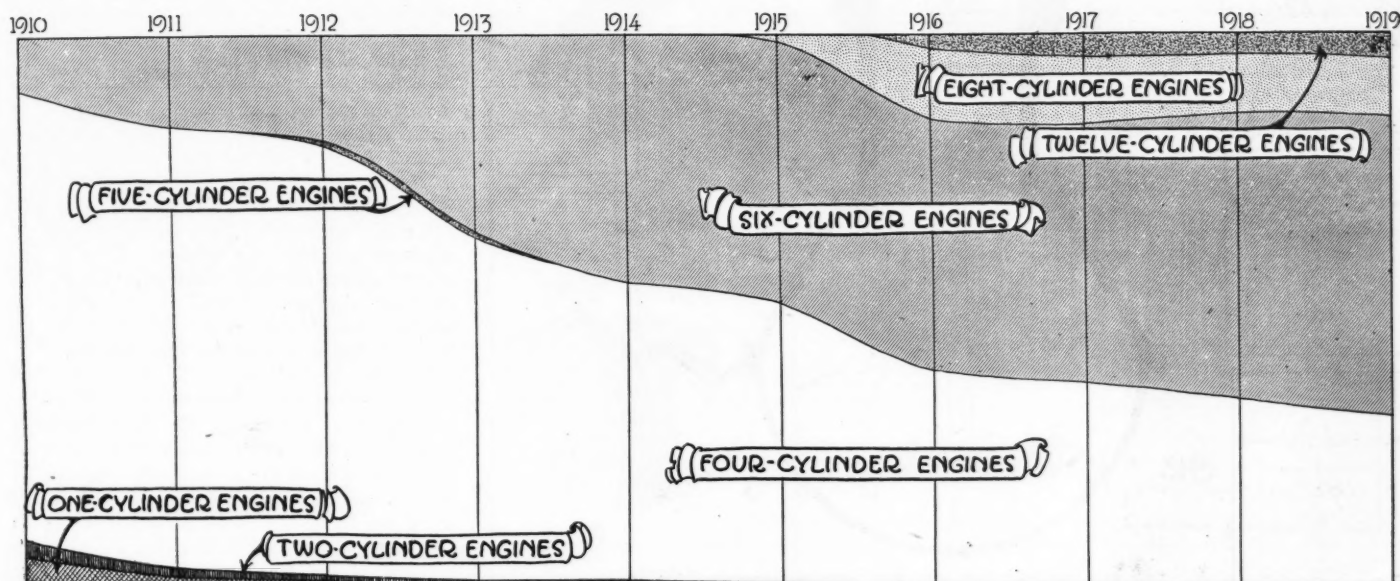
"Discharged"



1919 Cars Not Strictly Post-War

Little Change in Mechanical Features—
Many New Ideas on Drafting Boards

By J. Edward Schipper



How the proportions of fours, sixes, eights and twelves have changed during the last ten years, as indicated by the percentages of chassis models shown here by shaded areas

As yet, there is no such thing as the post-war car. In the first place the war has not been over long enough to have designed a car, put an experimental job on the road, removed the bugs, tooled up for production and bought material. In the second place, during the war the engineering brains of the country were too closely focused on beating Germany to have any thoughts for car design.

It is right at the present time that the drafting boards are busy in every factory in the country working on the post-war cars. It will be at least a year before these cars are really in production. The show of 1920 will be the show of the post-war car. The show of 1919 represents the cream of the pre-war design. It is the product of 1918 combed out and refined in many particulars to bring it strictly up to date.

Too Early for Surprises

It is too short a time after the war to expect surprises at the motor shows this year. Yet we know that there are new things in store for us that another year will bring to light. Concerns which put up factories to build material to help win the war are not going to let these factories stand idle now that the war is over. Take concerns like the Lincoln Motors, founded by H. M. Leland and his son, W. C. Leland, of Cadillac fame, and like the Chalkis company, founded by Hugh Chalmers and William P. Kiser, well known in the Chalmers' organization. Both of these concerns are looked to for new products which are soon to make their appearance. In fact, we have seen experimental cars coming over the roads around Detroit which it would be a breach of faith to disclose at

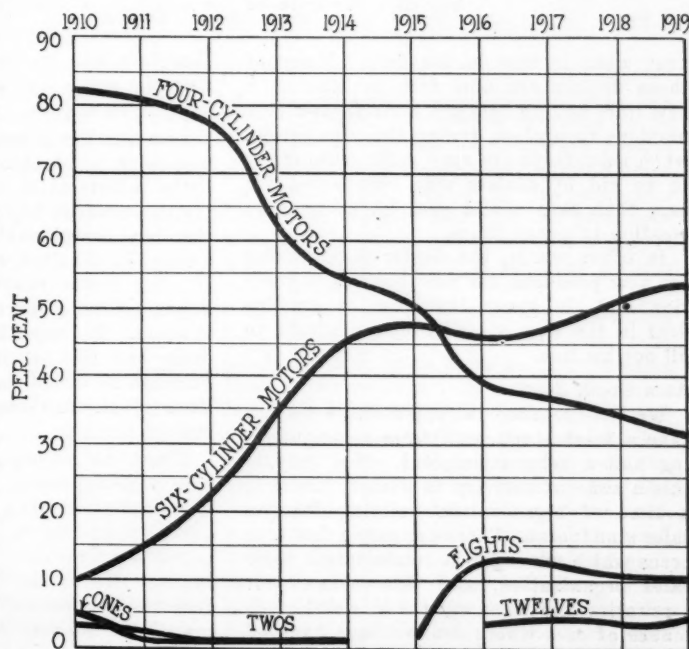
the present time. They are not yet ready and will not be in production for months.

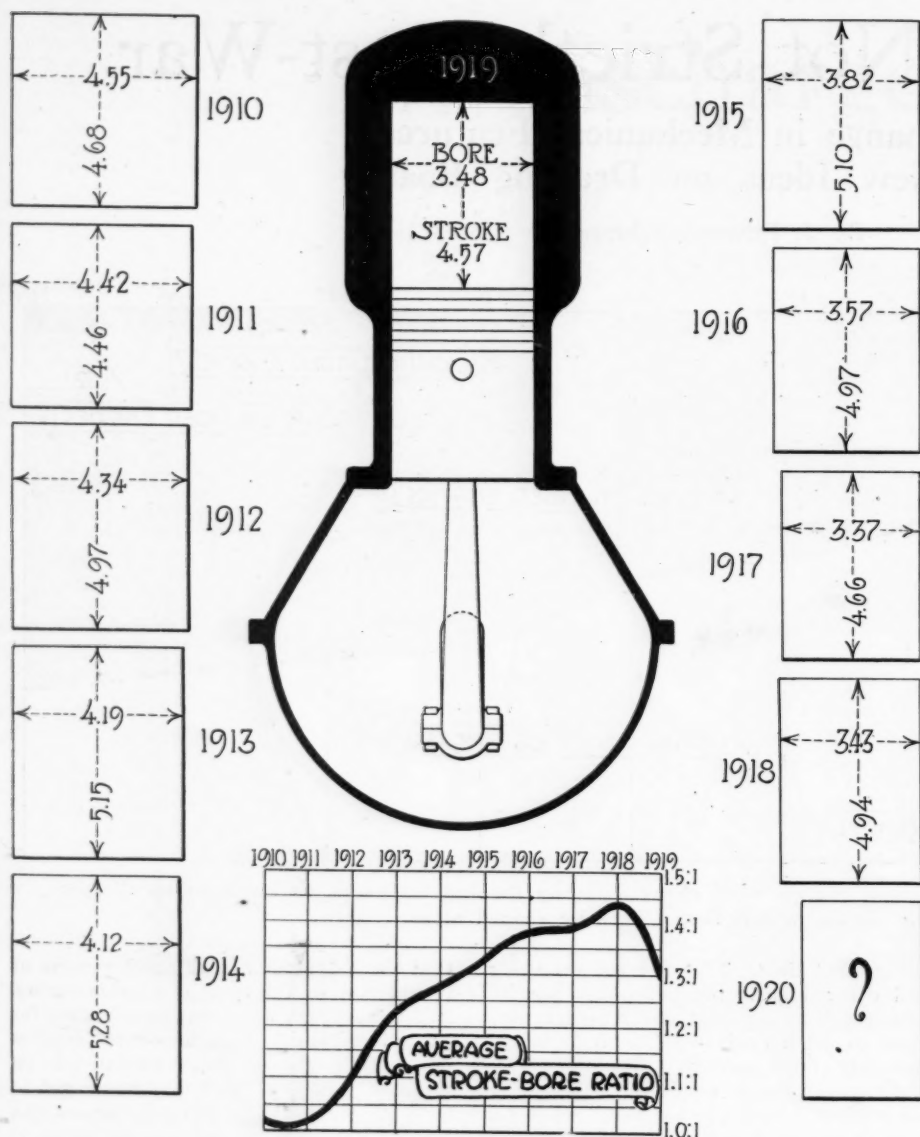
Suffice it to say that never before were there so much engineering activity in the factories of the industry. There is an atmosphere of bustle about the engineering department which has not been noted for months and in some plants for even years. One concern which has never left the six-cylinder field since it entered it several years ago has sent out inquiries to parts makers for eight-cylinder parts, showing

that the V-type of engine has lost none of its interest in the eyes of manufacturers. Another concern which has been known for its active support of multi-cylinder engines has a four-cylinder experimental job on the road which, while it may never get to be a production job, certainly shows the interest of this concern in a type which it hitherto had looked on as a relic of the past.

Many are the pilgrimages which have been made by dealers to Detroit to look

Plotting the progress of the cylinders. How the proportion of engines of each number of cylinders has changed during the last ten years as indicated by the percentages of chassis models of fours, sixes, etc., each year. Note that the proportion of six-cylinder engines has increased each year, until this present one, and that the proportion this year is the same as in 1918. The percentage of fours has decreased correspondingly. These are based on chassis models, not on cars actually produced





Dimensions of the average engines of the last ten years as based on the chassis models listed at the beginning of each year. Note that the ratio of the stroke to the bore is less this year. The reason for this is indicated by the curve in the first column of page 22, which shows not only that the stroke is less this year, but that the bore of the cylinder is greater

over what is new in the field. Many of these dealers are now free to take on a new line, having brought their former connections to a close during the war period, when manufacturers were much more ready to be rid of dealers who clamored for cars than they would ever have imagined possible in peace times.

In other words, the dealer is searching for new products, for new lines of connection and, in many instances, a broader field in the way of additional products to fill out his line.

At a Fresh Start

We have reached the point where we can take a fresh start, both from an engineering and a sales standpoint. Not only is this a time of activity in design, but it is a time of organization building from a sales standpoint. There are only a few concerns which were able to retain intact their sales organization, and this means that territories are now open for well-known makes of cars where dealers have handled the product for years. The show this year

therefore will be largely a matter of setting the stage for the new products which are yet to appear.

The war has given the manufacturer opportunity to cleanse his product. All the little defects which may have existed during the stress of big production, previous to the big curtailment, have been cleared away. In the days when a change meant a slowing down that could not be allowed, anything of a minor nature went through as it stood. The lapse in big production, however, has furnished the chance, full advantage of which has been taken, and the lines of all manufacturers are thoroughly refined.

Thus, the models shown at the exhibits this year represent what wise buyers always have sought; a product that has been on the road long enough for the minor imperfections to have been found and eliminated. Never has there been brought before the prospective buyers and the dealers of the country a more imposing array of thoroughly tried models representing the

pinnacle of all we know in motor car design and manufacture.

It may be that we will go off on another tack in the designs to come. There are many engineers who predict that we are entering a renaissance period in design and this is very well possible. We certainly have not reached 100 per cent perfect in many respects, although what has been accomplished has been a long step in the right direction. In fact, if cars do change within the next five years to any material extent, it will probably be in the direction in which past trends have been carrying us.

After all, a motor car is merely a medium of transportation. To improve, it must either mean more efficient transportation or more comfortable transportation. To give more efficient transportation it must carry us faster, farther or both for the same amount of fuel, oil or weight of material put into the vehicle. Less of our money spent for fuel must go through the exhaust pipe or radiator in the form of wasted heat, and more of it must go into driving power at the rear wheels.

Lubricating oil must be used so that every particle of it does its work in maintaining the necessary oil film between wearing parts. Furthermore, the car must be more efficient from the great standpoint of maintenance. For, what does it profit us if we have the most economical car in the world from the standpoint of gasoline and oil, if the small repairs which are always sure to occur cost so much money that all the savings in other directions are used up?

Maintenance Is Improved

The matter of maintenance is one of the greatest lines of improvement that can be found in all our cars. There is something wrong when it requires \$9 worth of labor to get to a part it costs but 50 cents to replace, and yet this is not an exaggerated case. If we are going to profit in the matter of design from the war, it cannot be along a better line than this. It was one of the first matters looked into in the war designs of trucks. It readily was understood that there could not be any delay in the field in making replacements. The part must be readily removed and the work of slipping another into its place must be accomplished with the least possible difficulty.

It is the time element in the repair business that eats up the money. With mechanics' time valued at from 75 cents to \$1.25 an hour, depending on the locality and the nature of the work, it does not take many hours of fooling with inaccessible nuts and bolts to run the repair bill out of sight.

Searching the specifications of the cars put out by representative makers, the impression gained is that there has been a period of housecleaning. In many cases those who had several models before we entered the war have but one at the present time. There are none of the leftovers of previous years. Everything is on a clean-cut basis, and only the good has survived.

There are some cars which, though designed before we got into the war, did not make their appearance until after the armistice was signed. Probably the most typical of this is the Essex. This car was just about ready to be placed on the market

when Uncle Sam raised his hand and proclaimed a cessation of steel shipments to any but 100 per cent war industries. The Essex, therefore, was held up and in the interval was given all the tests that could be thought out and refined to an even further degree. This is perhaps as near to the post-war car as we have at the present time.

The new little Overland car shown a year ago is much in the same position, although it is not as yet in production. This car, which will be on the market in April, was designed some time before we got actively into the war and was about to be manufactured when the curtailment order came through.

Both these cars typify to a large extent what may be expected in future designs. They are light and with particular attention to securing the utmost return from every pound of material that is put into the chassis. In the future car, the question that engineers will ask is not, "What is the wheelbase?" but, "What do you get from the wheelbase?" In other words, how much is lost in hood space and in other ways, and what is gained in the way of seating capacity or comfort for the driver and the occupants of the rear compartment?

Reason for Light Car

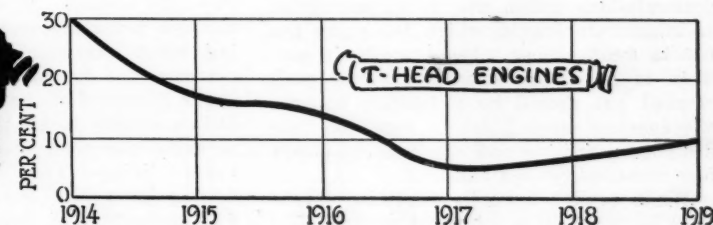
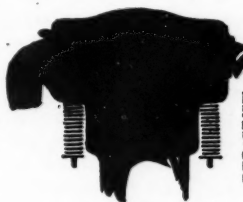
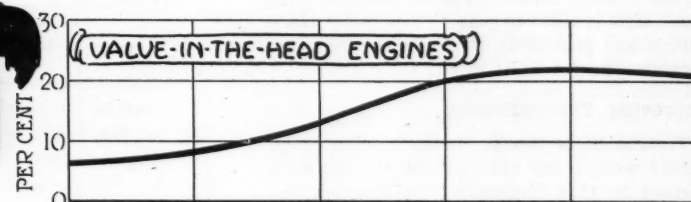
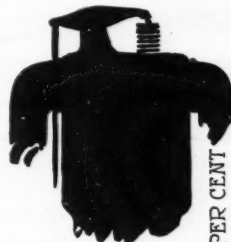
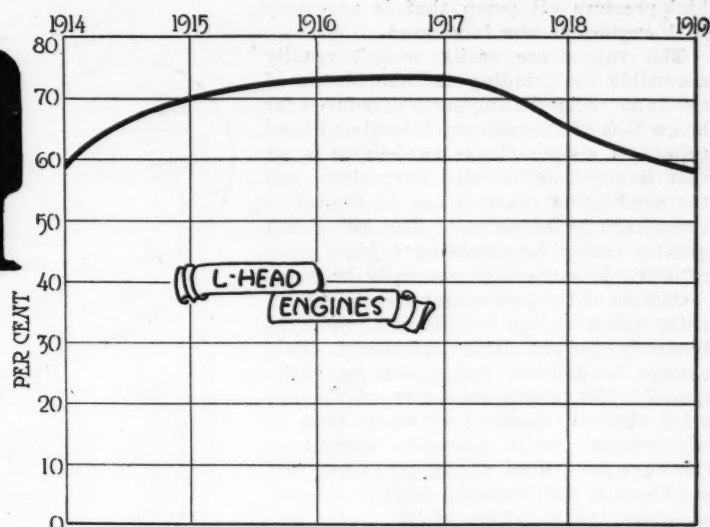
The reason for the light car is self-evident. The increasing cost and scarcity of fuel is driving us to the economical car. The less dead weight to move, the greater the economy we are going to secure. Again, and probably even more important, is the consuming desire of the American driver for performance on high gear. This means accelerative ability carried to the highest degree.

Acceleration in a car of good design and with proper bearings to keep rolling resistance at a minimum means simply the obedience to the old law of physics which, in motor language, says the more the weight of the car, the less the accelerative ability, and the more the engine torque, the greater the accelerative ability. Thus we find that all efforts are being made to get greater torque with less weight to increase the performance ability.

The two factors of increased torque and reduced weight, not only as a basis of better performance but as the leading factor in economy, lie behind all the changes of importance that are to be found in the cars now on sale and in all probabilities will be the factors which decide the specifications of the real post-war cars to come.

The reduced wheelbase is here, not because of any objections to long wheelbase itself but to the qualities of weight which it carries with it on account of the necessarily longer frame. The fact is that designers have been able to secure an increased amount of passenger space from the same amount of wheelbase because they have been able to shorten the hood either through the cleverness of design or because of the improvements in the powerplant enabling them to secure a greater output from a shorter engine.

On the other hand, the spring designers have been able to prove that a short car is not necessarily one in which the riding qualities are poor. The longer springs have



Comparative popularity of the L-head, T-head and overhead-valve engines is indicated by the proportion of chassis models during each of the last six years. Note the increase in percentage of the overhead-valve engines till 1918. Lack of engineering development this year prevented any change in this respect. The seeming recovery of the T-head, at the expense of the L-head, this year is caused by the fact that the number of models this year is smaller and the absentees are mostly L-head users

lengthened the period of vibration which was always too short on the short cars and largely have done away with the tossing or throwing action that has commonly been considered a standing fault with all short cars.

The shorter powerplant is almost certain to be one of the post-war developments. It is too early to predict as yet just what we will have a year from now, but it seems quite certain that if the war is to leave its influence on car design to any marked extent, it will largely be in the effect of the airplane on the engine. What we secure from the airplane engine is the greatest amount of output from the smallest type engine and at the same time the lightest it is possible to design. It is not necessary in car practice to go to the extreme light weight. Or perhaps it is better to say that the extreme cost of the ultra-lightweight engine is not justified in motor car practice. The post-war car, though, will push the dividing line further toward airplane practice than ever.

In securing the shorter and lighter powerplant, it is quite certain that the overhead camshaft engine is going to be more of a factor than ever. At the present time there are more of these engines down on the drawing boards of the engineers than ever before. Not only for passenger cars but for trucks and tractors it is almost safe to predict that it is the next general move in engines.

It has the advantage of having the valves on opposite sides of the cylinders, thus allowing them to be large and at the same time to be without influence on the overhead length of the engine. The mechanism for driving the shaft readily can be oiled from a pressure feed system, and with the increase in the use of the pressure feed the oiling difficulty, which is one of the matters which has previously stood in the way, largely disappears. A type of drive such as that used on the Liberty engine, for instance, would lend itself readily to passenger car practice and at the same time furnishes a ready means of handling the

high-pressure oil pump that is necessary with engines as now lubricated.

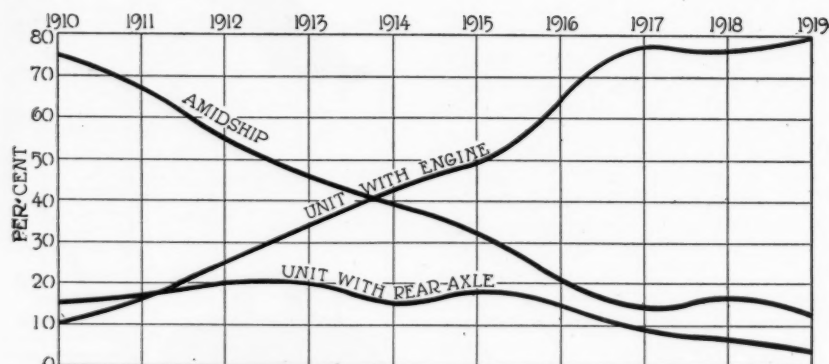
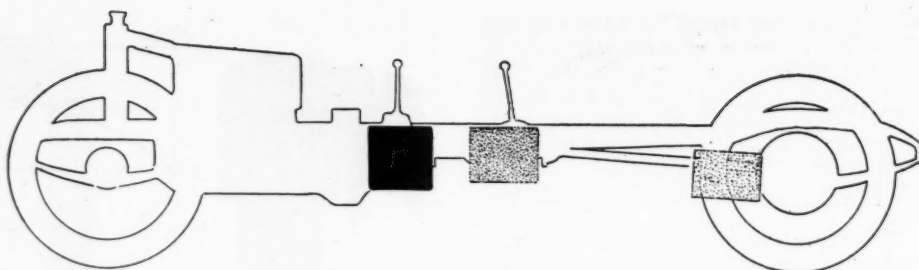
The valves are easily cooled, readily accessible for grinding and the inertia of the valve reciprocating parts is reduced far below that of the ordinary L-head or I-head types. A simple rocker mechanism is all that is required to drive the valves, and the combustion chamber can be shaped to the maximum advantage. The latter is a greater factor in obtaining a high mean effective pressure than generally believed.

Outside of the powerplant and the lighter units which will go hand-in-hand with the tendency toward higher efficiency, little change in general design can be anticipated. Yet, there are parts of the car other than the powerplant where lines of improvement still suggest themselves. Clutches have been nearly perfected, and yet there is still room for improvement in securing lighter action of the pedal and more separation of the disks in the oil type, so as to prevent the objectionable drag which always occurs in cold weather with the disk-in-oil types. The dry-plate clutch has proved itself to be a very successful type for light work.

Improving Transmissions

Transmission design must be improved before we can say that we are 100 per cent perfect in this direction. Driving on the lower speeds at anything more than crawling pace is too uncomfortable in 95 per cent of our cars. There are reports of transmissions which are being submitted to manufacturers, in which the gears are not in mesh except when actually in use. This is an improvement which if well worked out should be welcomed, because the constant-mesh gears in even the best designed gearboxes not only consume power but eventually cause noise.

While brakes have been getting larger year by year, it is still to be doubted if the average car has adequate brakes for



The unit powerplant still increases in favor, the gearset in unit with the engine increasing in proportion to the total number of chassis models at the expense of the rear axle and amidships location as shown in the curve below. Above is shown the relative values of the different locations this year

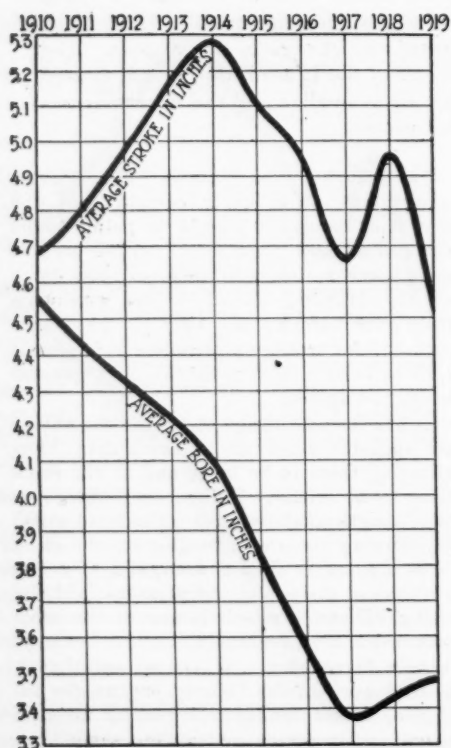
hilly work. In fact, it may be doubted that the brake design we are using is fundamentally correct. It is impossible to tour through mountainous country without seeing many examples of burned-out brake systems, due to the use of the system to check the speed of the car on long descents. It is necessary to use the engine as a brake or suffer the consequences in the form of burned lining. The transmission brake is finding favor abroad, and it may eventually find favor here in spite of the opposition and prejudice which it now encounters.

The new tire sizes which have been regulated by the Government are working out well, and manufacturers have swung into line, as was to be expected, so that deviations from standard types are not to be found this year. The use of cord tires is increasing remarkably, both as standard equipment and in retail sales. It has been found by owners that the greater dependability of the cord tire has made it cheaper in the long run, although higher in first cost. It is freely predicted that tire prices will descend shortly and be on a basis which will be of far greater advantage to the user than during the last year. The quantity manufacturer of cord tires will tend to bring the price of this type down, so that it can be reasonably expected that during the next year a marked increase in the employment of this type of tire will result.

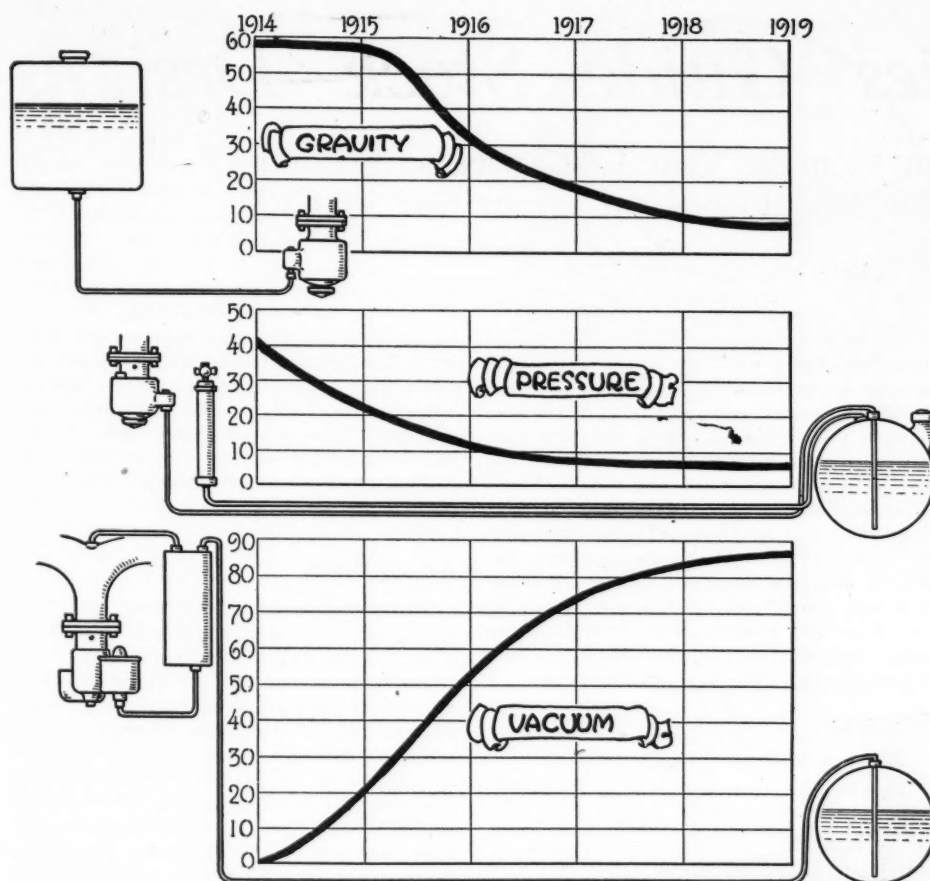
Body Designs

Body design will not show much of a change as far as exterior appearance is concerned. The high-hood, straightline type has apparently come to stay, and there is little to differentiate the car of 1919 from that of 1918 by outside lines. On the other hand, the interior of the body design is being more carefully worked out than ever before. This is due to the fact that the employment of shorter wheelbases makes necessary a more economical use of space and a better balance between the front compartment and the rear. The super-elongated tonneau with the close-coupled front compartment, with its curtailed leg room, is disappearing and in its place a better balance is being struck between the driver's space and the passenger compartment.

Not all the room is being gained in the body. As has been previously pointed out, the hood space is shorter and some gain is made here. It is also possible with the



Average horsepower and average bores and strokes of the engines. Note that the average stroke which dropped from 1914 to 1918 took an up turn and again has started to drop. On the other hand, the cylinder bore is getting larger. The rated horsepower has increased till it is as great as in 1914



Six years of change in methods of feeding the fuel to the carburetor. Note the increase of the vacuum system and the proportionate dwindling of the gravity and pressure

unit powerplant construction in general use to push the front of the body quite close to the rear end of the cylinder block, allowing the clutch and transmission parts to lie below the sloping floorboards of the front compartment. Very little is lost also between the radiator and the fan, and the fan itself does not project as far out in front of the engine as it used to.

Improvements in color work are sure to be noted in body painting very shortly. The increase in knowledge of pigments made by American manufacturers during the last year has been marked, and we are sure to find some new durable colors added to our list. There is no denying the fact that some of our colors have given us trouble during the last year, having proved themselves far from durable and far from stable. It has been difficult for some manufacturers to be sure that the first and last cars of a run would have the same shade, but this color proposition is one of the points in which we have made strides during the year.

DEEDS IS EXONERATED

Washington, Jan. 17—Complete exoneration of Col. E. A. Deeds has resulted from an investigation by a special War Department board of inquiry. Colonel Deeds was recommended for trial by court martial by Charles E. Hughes in his report on aircraft production which charges that Colonel Deeds had given out misleading information with regard to production. Secretary Baker announced yesterday that he ap-

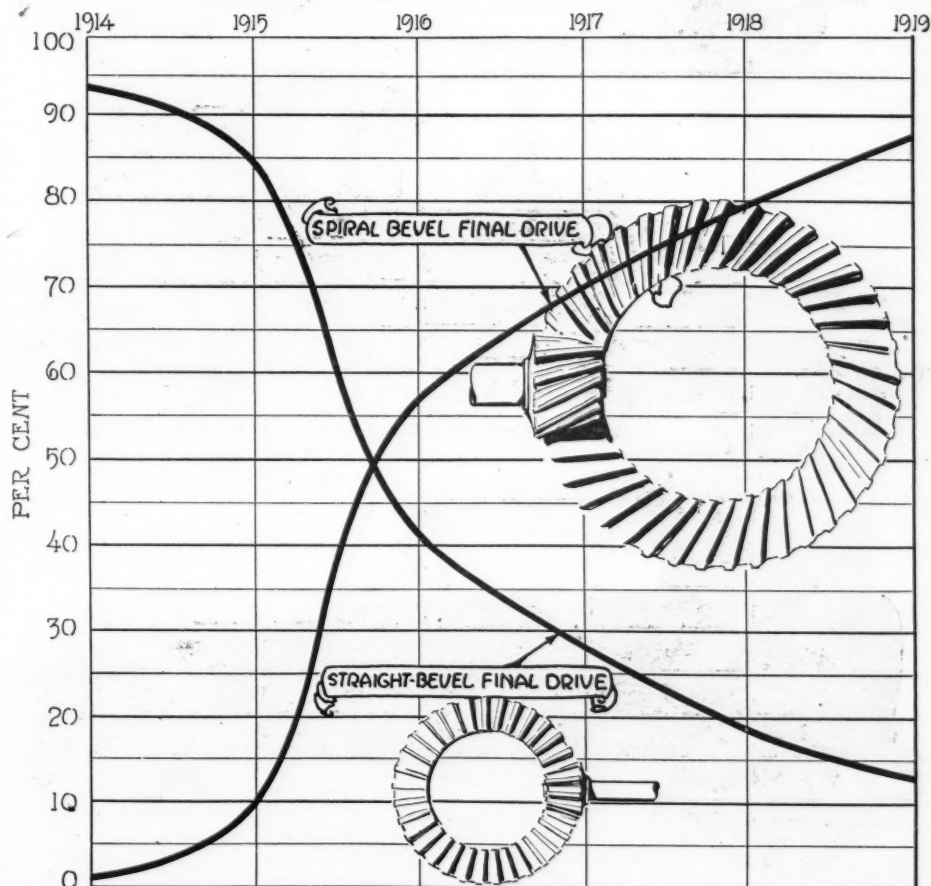
proved the findings of the board of inquiry and the case is completely closed.

The findings of the Judge Advocate General were submitted with a letter by Secretary of War Newton D. Baker to the chairman of the Committee on Military Affairs of the House. Secretary Baker's letter states that Colonel Deeds, absorbed in the activities of aircraft production, neglected to attend to personal transactions and this neglect created appearances which these findings show in their true character.

The findings deal completely with all the correspondence relative to the charges against Colonel Deeds and include letters and telegrams showing that Colonel Deeds was reluctant to accept a Government position because of his airplane interests but that he did so at the urgent request of both Howard E. Coffin and the Secretary of War. The telegrams which passed between Colonel Deeds and the Dayton companies show, it is said in the findings, that the colonel "zealously tried to protect the best interests of the Government."

"It must be remembered," says the findings, "that at the time Mr. Deeds received his commission he was in Washington and not in Dayton, where his business interests were located, and he could not reasonably have been expected to attend to the details of the stock transfers himself and did not attempt to do so."

In conclusion the findings quote John D. Ryan, former head of aircraft production, to the effect that Colonel Deeds performed a great service in expediting Liberty engine production and by not observing the strict regulations probably hastened quantity production by many months.



Increase of the spiral-bevel drive and decrease of the straight-tooth bevel based upon the number of chassis models for each year

Custom Bodies Guide Stock Designs

Possibilities for Coming Year List Increasing Popularity for Sedan and Coupe on Farm and in City

By Porter E. Stone, M. E.

SINCE the United States entered the world war, the motor car body has undergone no radical change. In fact, to date back to 1914, the car has much the same general appearance; only detailed changes have occurred. We always have looked to the European carrossier to bring forth radical changes in styles and designs. This is due, first, to lack of quantity production; second, no European chassis builder attempts to design fenders or styles of trimmings and bodies, as he realizes it is an art of long study and not a mathematical or technical problem.

Let us consider what has been done in

different sections of the United States. In the East there has been a prevalence of special bodies on cheap chassis. The Victoria top on open cars and the folding landaulets are still used. It is the only part of the United States where one may see the landaulet car with top folded back. The Middle West has developed the demountable top or standard cape top with glass sides to replace the curtains for winter use. In Southern California there is a new departure, or rather a return to the 1904-1906 models, with lines modernized, that is, the old demi-limousine demountable top. The top is made of wood or

metal and the rear side-quarters are solid with fixed glass windows and material curtains with celluloid lights. These tops are put on cars of all prices and certainly are adapted to the climatic conditions. In the South very few cars are to be seen with special bodies or variations from the manufactured car.

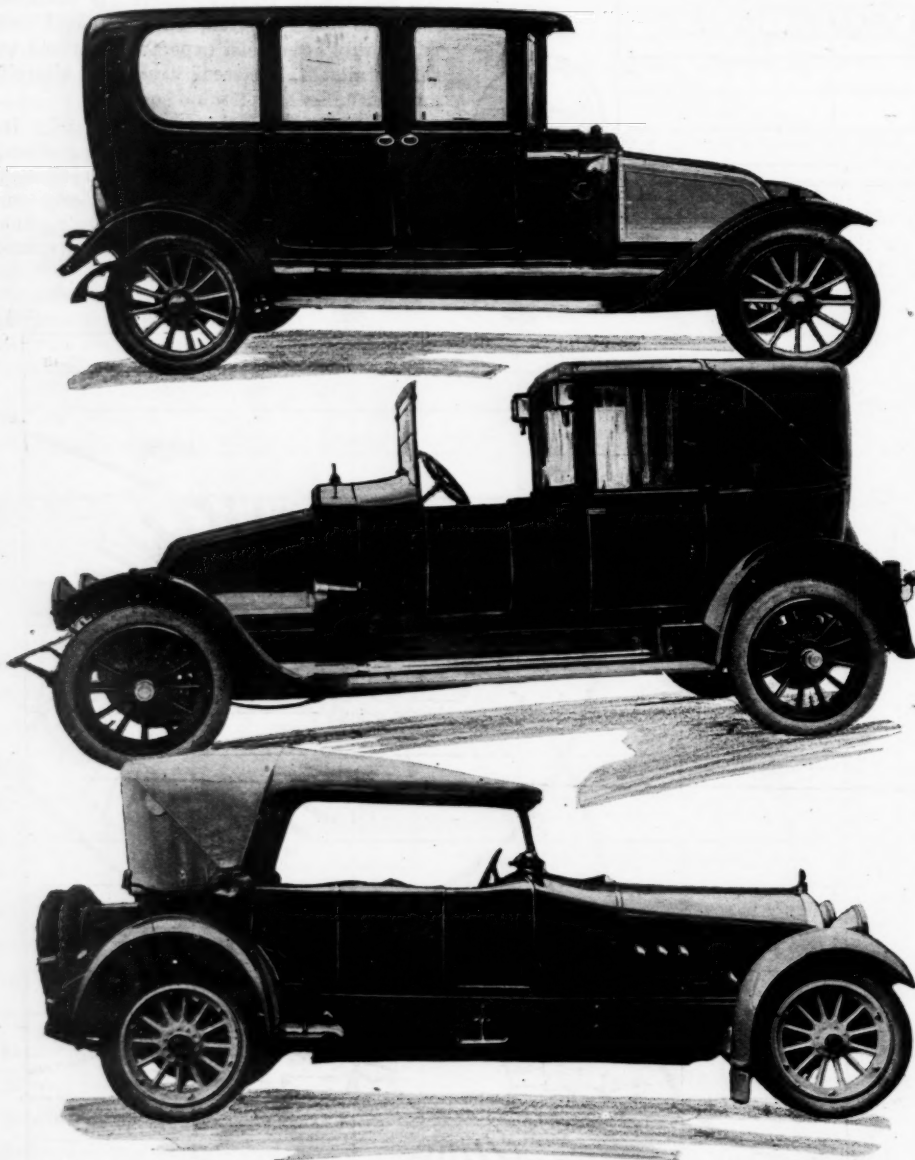
General Design

The manufacturers of bodies have kept to the curved lines throughout. There are a few cases where they have used sharp corners or angles. If the large majority of bodies were removed from the chassis and placed together, the average owner could not distinguish probably more than 5 per cent of the makes. He would know the Packard, due to the pillar on the front of the body; the Ford, from the corner pillar, which is used on the back; the Pierce because of its extreme weight, and a few of the sport type bodies and cloverleaf designs. The closed body designed and manufactured by Cunningham for funeral and livery work has become quite standardized for that trade. Open cars still are using, to some degree, the center cowl, but it is losing its prominence of last year. Also, more bodies are now to be seen which incorporate a bevel edge around the belt.

Practically all makes of cars are using the slanted windshield. This is probably one of the most noticeable changes from last year's designs that has been adopted by all manufacturers. The slant windshield has two very good features. It shortens the top by several inches, and it gives much better vision to the driver, especially when a car is coming from the rear with lighted headlights. It also slightly reduces the head-on wind resistance of the car. The only bad features that have developed from this type of windshield is the danger of getting too much slant and interfering with the entrance to the front seat. Then, too, it is not nearly so waterproof as the straight windshield and is very likely to let drops of water into the laps of the occupants of the front seat.

Fenders, or wings, have shown a very strong tendency to go back to the older type, that is, the fender with the drip edge or skirt in place of the one-piece crown fender. Although nearly all fenders have a small crown at the present time, the front fenders on all cars are double-curved and the rear fender comes down quite low on the rear wheel. Tire carriers now are carried almost universally on the rear of the car in place of on the running-board or in pockets in the front fenders.

In general, we may say all cars have re-



Some of the newer custom bodies applied to American and foreign chassis. Top—berline-limousine fitted to Renault chassis; center—landaulet-limousine applied to Renault; bottom—special sport-type body on Crane chassis

ceived considerable care in trimming up loose ends and making for a more symmetrical and cleaner cut.

Colors

The standard black chassis has become almost universal and probably is one of the best things in painting that has been done for some time, as the chassis and fenders receive most of the dust and sand and need touching up much oftener than other parts of the car. The wheels, however, are often lighter colors.

Several companies are bringing out two-tone color jobs. This consists of two tones of the same color, the body being the lighter and the fenders, wheels and chassis, the darker shade. The wheels often are painted the same shade as the body. Many pleasing effects have been derived from these two-tone color combinations. Very few manufacturers at present are striping the body, chassis or wheels. This is due to the fact that there are very few moldings on any open cars.

Manufacturers of colors have had an exceedingly hard time in getting the right chemicals for ground colors to manufacture shades of red and other primary colors. Thus, they have been limited in their varieties of colors. A few of the paint concerns have specialized on tones of off-colors and have succeeded in producing a few very rich and beautiful shades.

Trimming

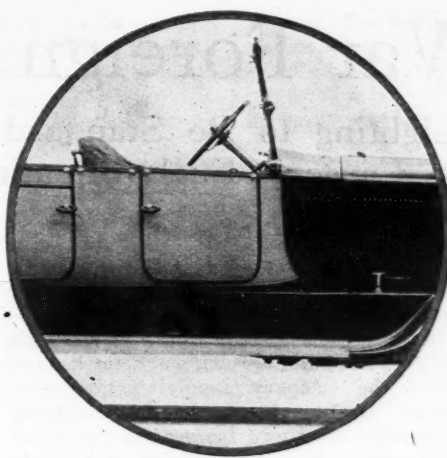
The most noticeable change in trimming the last year has been to make the cushions thicker and backs more comfortable for the driver and the occupants of the car. A few chassis designers have realized that the occupants and driver should share room to breathe with the engine.

There have been many new arrangements to better the curtain situation on cars. Curtains almost always are carried in pockets concealed or fastened to the top. The curtains when in use now are fastened to a metal rod at the front of the door so the curtain will open with the door, in place of the occupant stopping to unbutton and button the curtain every time he leaves the car. There are practically no cars making a back curtain that rolls up. This holds true from the cheapest to the most expensive cars.

The higher-priced cars are incorporating plate glass for the rear lights, but it is likely this will not be used by the cheaper cars, not only due to the cost of the glass but the necessity of making or using a head lining for the back, together with a wooden or metal frame to hold the glass in place. These frames generally need staying or webbing, since the glass weighs so much more than the celluloid or transparent lights.

French pleats are holding their own. A few manufacturers are returning to the button style of trim with either a square, diamond or diagonal pattern. There has been a large dropping off of all binding, pasting, welts or laces.

Almost all makers of the medium-priced and cheaper classes of open cars are using fabrics manufactured by the large chemical companies for upholstery since it has been shown that materials of this character will outwear the cheaper grades of ma-



Characteristic pillar on Packard

chine-buffed or split leathers. These fabrics retain their color, and heat or cold does not affect them materially.

Body Construction

The most noticeable change in body construction has been due to the fact that chassis builders are making much more rigid construction of the chassis frame. The stronger chassis lessens the necessity of patented anti-rattlers on doors, locks, etc. Also, it has considerably removed the strain carried by the sills of the body, allowing a much lighter body sill. There is a general tendency for body engineers to place the body on brackets several inches removed from the chassis frame proper. This has been done, not only on account of the rigid construction of the chassis frame but also to remove a great many of the

creaks that used to develop between the wooden sills and the metal frame.

The popularity of concealed hinges is becoming more apparent every year not only in open but in closed bodies. Several manufacturers are incorporating an exposed curved hinge at the bottom of the door. This adds some to the rigidity and strength of the door, owing to the fact that the concealed hinges of necessity must be very light to be placed in the small pillars now used on cars.

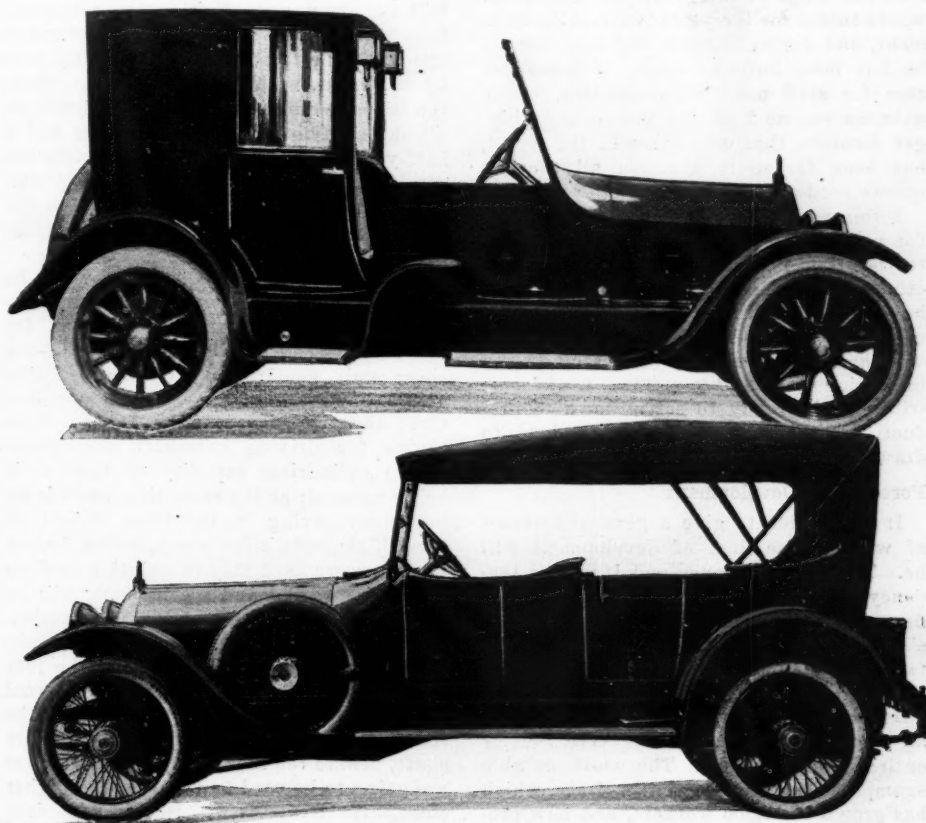
Less Aluminum Used

The use of aluminum has been dropped almost entirely, not only on account of the trouble which has developed from corrosion of the sheet aluminum when used in very damp salt climates but also the difficulties that arise when the body has been dented or injured, as aluminum is very hard to solder and repair neatly. The body sheet steel or the leaded sheet steel now is used almost exclusively. It is not only formed more easily for the quantity manufacturer, but is also easier to repair, as it will solder and can be handled with considerable ease. The weight of 14-gage aluminum per square foot does not differ from the 20 or 22-gage sheet steel, so that the argument of weight which some of the high-priced manufacturers used to talk is not of much consequence.

Custom Bodies

Every year we see the popularity of the custom-made body becoming more apparent. This is partly due to the fact that engines are growing more and more standardized and the buying public realizes that

(Concluded on page 40)



Town brougham on Stutz chassis, above, and standard touring body with center cowl on Crane

Post-War Foreign Cars

Starting and Lighting to Be Standard Equipment—
French Plants Larger—Fuel Situation Still Bad

By W. F. Bradley

Motor Age Special European Correspondent

THE French motor car factories have two features in common: they have all increased enormously in size, and they have all completely modernized their plants. The number of workers at the present time engaged on purely motor car work is estimated at 800,000. During the war not a single one of the factories has been kept exclusively on motor car work; yet the change has made itself felt in varying degrees. The biggest car producers during the war have been Renault, Berliet, Panhard-Levassor, Saurer, Delahaye and De Dion Bouton. But these firms have not by any means been exclusive producers of trucks and cars.

War Work of French

Renault specialized on aviation engines right at the beginning, then extended to planes and for the last year has been a big producer of tanks. Berliet has been a producer of aviation engines and tanks. De Dion Bouton has built Hispano-Suiza aviation engines, gun carriages, searchlights and motorized artillery. There are car factories which for three years have not built a single car. Darracq is in this class, the whole factory having been turned over to aviation engines and planes, machine guns, etc. Delage transformed his modern plant into a shell-producing factory right at the beginning; in twelve months he had covered the whole of the ground he considered would suffice for ten years' normal development, and during the last eighteen months he has been building series of passenger cars for staff use. Hispano-Suiza, whose aviation engine has been produced in bigger numbers than any other in the world, has been forced to abandon all thought of car production.

Firms which have received army orders for passenger cars are naturally in a better position than those having worked on other classes of goods. Some of these firms have been building what may be considered as peace models for over a year and have had the opportunity of watching them in service with the army. Thus, while some will soon be ready to settle down to production, other firms are still confined to drawing office activities.

Forecast of Development

It is possible to give a general forecast of what future lines of development will be. Throughout France and Italy the tendency of the war has been to make the big firms more and more independent of outside supplies. The specialist idea has not taken hold. Some of the newcomers will produce cars with engines from A, transmission from B and rear axle from C, but all the big, well-known firms have become entirely independent. The most notable example is the Fiat Co., Turin, Italy, which has grown to 40,000 workers, and now produces its own castings, forgings, ball bearings, magnetos and electrical appliances, accessories and bodies—in fact, everything

but the tires. In France, Renault has followed the same general lines, for although he does not build his own magnetos he controls the company supplying him with these. De Dion Bouton has been building magnetos in its own factory for two years and will continue to supply its own wants and meet those of some outsiders.

The magneto has lost ground since the war. As every European after-the-war car will be built with electric lighting and starting, designers no longer look upon the magneto as an absolute necessity, and several have eliminated it in favor of battery ignition. Others admit that if they have not done so at once it is because they are afraid of public opinion. French motorists, in particular, have been educated to the belief that the only perfectly reliable ignition was by high-tension magneto.

Number of Models Cut

All firms have cut down on the number of types of cars, but very few have decided on a single model. Two probably will be the average. The big firms, too, are going to continue building touring cars and trucks with, in many cases, agricultural tractors in addition. Four cylinders are going to remain in the majority, but there will be many more multi-cylinder engines than was the case in 1914. The preference appears to be for the vertical six, followed by the eight, with the twelve last. Thus, the Hispano-Suiza company, which has been all out on aviation engines for three and a half years, considers that six cylinders are sufficient for a high-grade touring car. Fiat, after building sixes and twelves for air work, limits itself to sixes for touring car work.

Detachable cylinder heads will be adopted much more extensively; thermosiphon cooling will gain some ground for the smaller engines, but not for the big ones; unit construction of engines and gearbox is going to be a very strong feature; the tendency is to get away from chains for driving camshaft and auxiliaries; cylindrical capacity of engines is being reduced; at the same time there is an important saving in the total weight of cars; high-grade alloy steels, which before the war were used only in aviation engines and a few racing and special cars, will be made use of for the normal production. With unit construction of engine and gearbox both brakes are being put on the rear wheels, but in all cases they are internal expanding, not external. There will be several cases of brakes on the propeller shaft, behind the axle. Front wheel brakes are going to be used on many of the higher class cars. Gearsets will remain with four speeds and reverse. Springing is strongly toward cantilever, with a tendency in the direction of quarter elliptic for light cars.

Wheels will be metal, to the exclusion of wood. The vacuum gasoline supply system is going to be adopted rather extensively.

Few Plans Announced

Not many firms have announced their complete post-war program. The De Dion Bouton company, which was erroneously stated a few weeks ago to have passed into new hands, has just made it known that it will establish an erecting plant in England, this to be supplied with engines and transmissions from the French factory. The program of this firm covers two eight-cylinder engines and two fours fitting into two chassis. Thus, one chassis will be furnished with an eight-cylinder V engine of 60 by 100 mm., 2.3 by 3.9 in., or with a four-cylinder monobloc of 70 by 120 mm., 2.7 by 4.7 in. The second chassis will be equipped with an eight of 70 by 120 mm., 2.7 by 4.7 in., or a four of 85 by 130 mm., 3.3 by 5.1 in. In all four cases engine and gearset will form a unit construction mounted in the main frame by three-point suspension. In all models the De Dion Bouton engineers have decided on a two-bearing crankshaft. They will not be alone in this line of development, although 85 by 130 mm. is a bigger engine than has usually been considered suitable for a two bearing shaft. De Dion Bouton has been building the Victrix magneto in its own shops for a considerable time and will use these on all passenger cars and trucks. Electric lighting and starting will be found on all passenger cars, a single unit being employed and the whole installation built in the De Dion Bouton factory.

Four New Fiats

Fiat has announced much of its new program. The models will be four in number: An 8-hp. two-seater, built with both open and closed body; a 12-hp. four-cylinder light touring car, with open body; a six cylinder of less than 3 in. bore, and a high-class six of about 3½ in. bore. Some of the new features are electric lighting and starting for all models, detachable cylinder heads, unit construction of engine and gearbox, spiral bevel rear axle. Delage is producing a high-class six, with unit construction, electric lighting and starting and front wheel brakes. Hispano-Suiza, which was fully expected to come out with an aluminum eight, states that its leading model will be a high-grade six with valves in the head.

The most popular type of car is going to be a 10-hp. four-cylinder, with electric lighting and starting and a two, three or four-passenger body. The Citroen company announced that it will build a car of this type with a four-cylinder engine of 65 by 100 mm. bore and stroke, 2.5 by 3.9 in. It is commonly reported that the price will be around \$1,000, but this is really mere speculation, for it is doubtful if even the Citroen company knows exactly at what price the car can be sold. With the price

or most steels five times higher than in 1914, it is going to be a difficult task for any firm to build a \$1,000 car in France for the first year after the war. The Citroen company is one of the biggest and best managed in France. Before the war the firm was chiefly interested in cutting gears, but André Citroen, the president of the company, was also president of the Mors Automobile Co. and had other and close connection with the industry. There is no doubt that Citroen will be a leading figure in the popular car class.

Peugeot is another firm having already got into this 10-hp. class, with a popular four-cylinder model of 68 by 100 mm. bore and stroke. Some of these have been delivered during the war to the French army. Fiat is going to appear in about the same class. Whereas before the war the most popular type of car in France had cylinder dimensions of about 80 by 130 mm., 168 cu. in piston displacement, the post-war corresponding type will be reduced to about 90 cu. in. Some of the engineers claim that as there has been a corresponding reduction in weight and an increase in efficiency, these smaller engines will do all that was obtained from the larger ones in 1914.

New Tractors Will Come

Important developments can be expected in the production of agricultural tractors. Apart from the fact that the efficiency of French farms was low by reason of old-fashioned methods, horses have become so rare since the war that there is no alternative but to make use of gasoline tractors on the land. Many of the car factories are looking to agriculture to keep their works running, and the Government has pledged itself to encourage the development of the French agricultural tractor by all possible means.

One of the most important problems to be solved without delay is the supply of gasoline for civilian uses. The whole question has been put into the hands of the government committee known as the General Gasoline Committee, which has authority not only to improve methods of transportation but to discover national supplies of fuel. No car owner can obtain fuel without an official permit, and these permits are only given parcimoniously to persons doing work of national importance. Travel restrictions have become easier since the signing of the armistice, but owing to the impossibility of getting gasoline it is not possible to use a car for anything but local service.

Since the General Gasoline Committee got to work there has been some improvement, although it is hardly visible to the private owner. In 1917 the imports of petrol were 400,000 tons per annum. In 1918 they had been increased to 1,000,000 tons a year, and the reserve stocks had been increased sufficiently to allow private interests being considered. Not much improvement took place, however, owing to defective transportation methods in the interior of France. Certain important districts have been six months without receiving a single drop of gasoline for any civilian use. The number of tank cars has been increased; permission has been given to fill cans from the tanks in railroad stations; in certain districts army trucks are

to be used to deliver gasoline. The 1-gal. cans which are so extensively used in France are to be replaced in an important measure by 10-gal. cans, and the supply of cans has to be pooled. In the past refiners only received their own empty cans.

An early improvement in the gasoline situation is now being promised by the authorities. Last October Marchal Foch reserved 10,000,000 gal. of gasoline for the monthly use of the French army alone. The military requirements have decreased to such an extent that for December it was expected to be able to allot an extra 15,000 tons of gasoline for civilian use. It is quite probable that in a short time all gasoline restrictions will be removed.

The present price of gasoline in the neighborhood of Paris is \$1 a gallon, running to \$1.25 in out-of-the-way districts. For truck work in particular it is believed that the national fuel will be a mixture of 50 per cent of alcohol, 25 per cent benzol and 25 per cent gasoline. An important group of truck owners, among which is the Paris General Omnibus Co., has announced its intention of absorbing as much of this fuel as can be produced in France during the next four or five years.

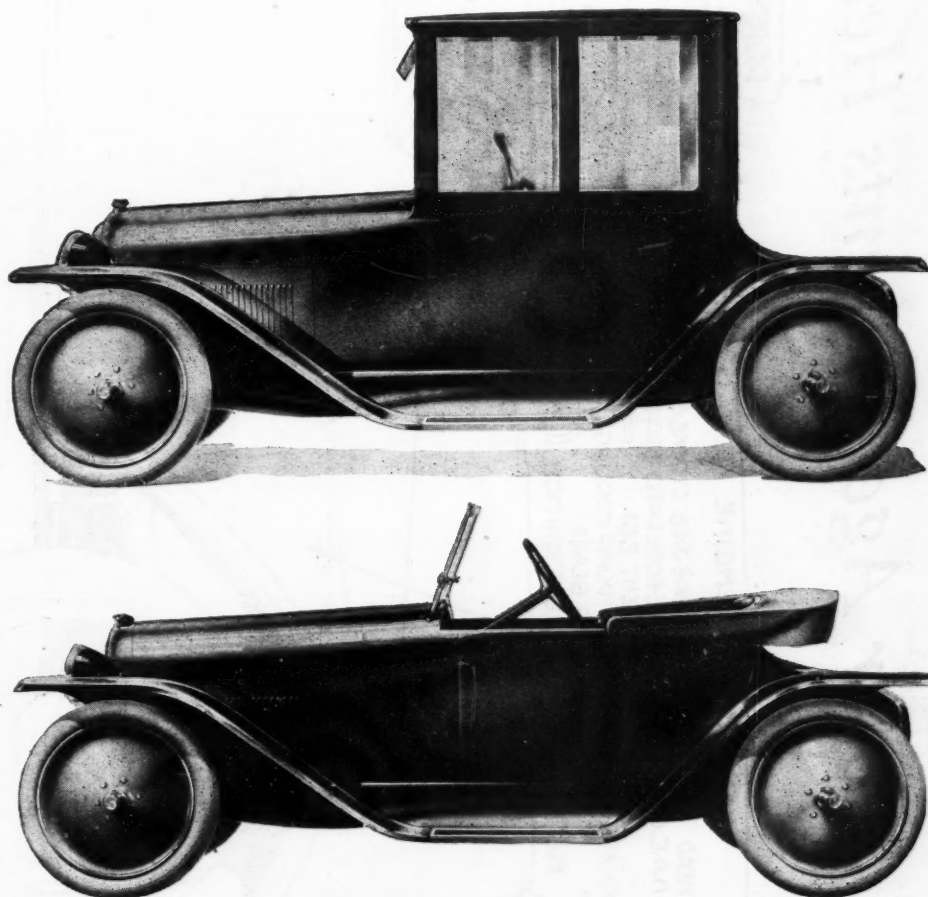
There is a decided tendency toward both racing and competition work. One of the best suggestions made is that a race or an important touring competition should be held in Alsace or in Lorraine during 1919. There is every reason to believe that this suggestion will be acted on, though it is not yet known what form the competition will take. The only racing cars in Europe are a set of Sunbeams in England, two

Fiats in Italy and three Peugeots of only 2½ liters cylinder capacity. These latter were built for a race interrupted by reason of the war. Several firms have got the advisability of racing under suggestion. One important organization has guaranteed to get a set of cars ready and a complete team together in four and one-half months. These cars would be available for either America or France, according to which country takes up racing first. A month ago the idea of any race or road competition being held in 1919 was considered foolish; now it is very much to the fore.

France Unprepared for Peace

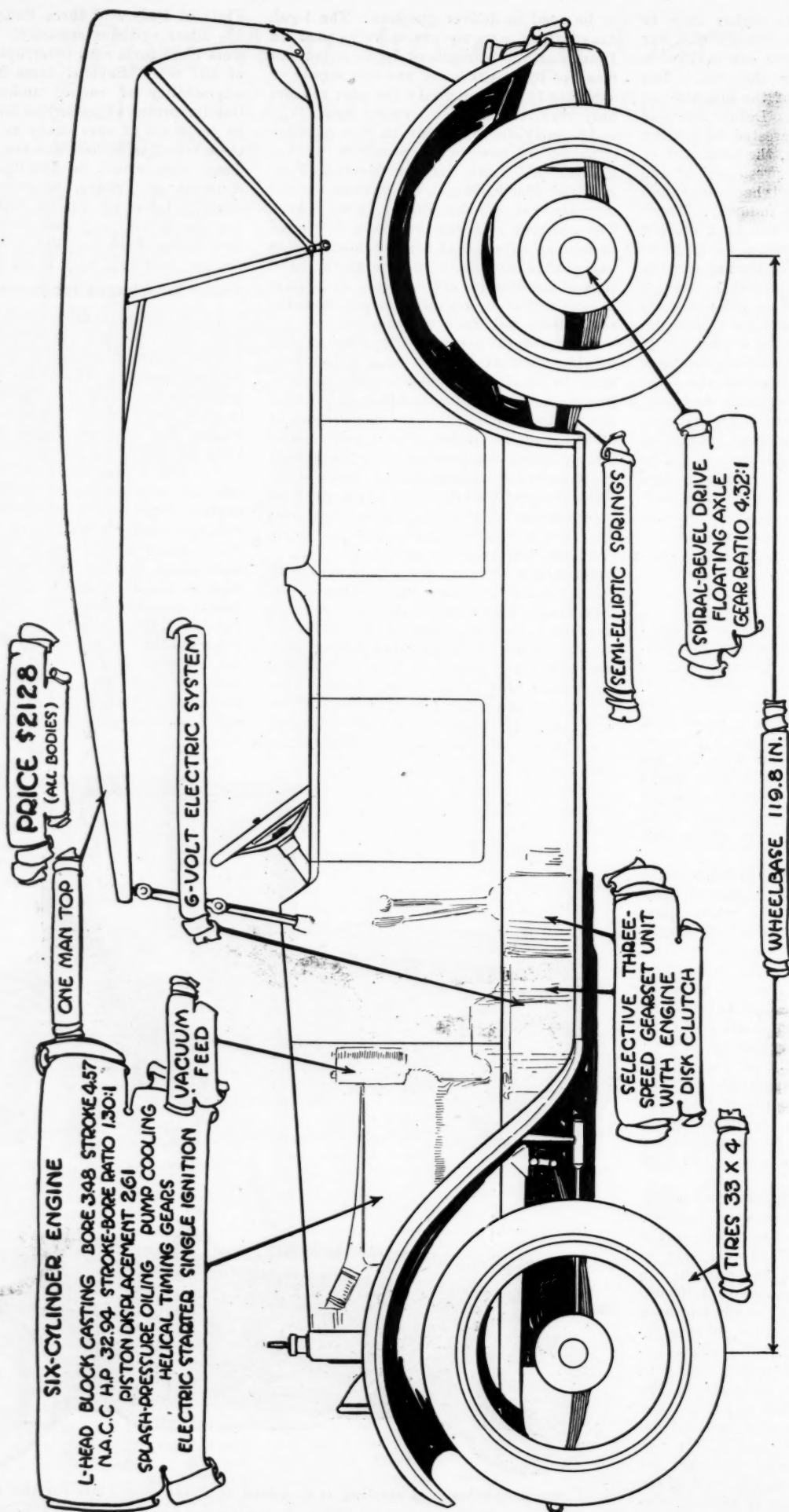
The armistice, coming much quicker than was ever thought possible, found the French industry generally ill-prepared for normal business. There are two dominant questions troubling the leaders. The first is what import duty will be established by France and whether England will depart from its free trade policy.

For over a year there has been a 70 per cent ad valorem import duty on cars and parts brought into France. This, however, was admittedly a temporary war measure, the ordinary duty being on a weight basis and being roughly equivalent to 10 per cent on the price of the machine. French manufacturers would like to see this 70 per cent duty continued for one year after the signature of the peace, to be followed for a period of one year by 50 per cent, then 20 per cent. This protection is obviously directed against America, the only nation in a position for quick delivery.



Electric lighting and starting is standard equipment of Fiats for the first time. The two shown are on a 10-hp. four-cylinder chassis with the block engine

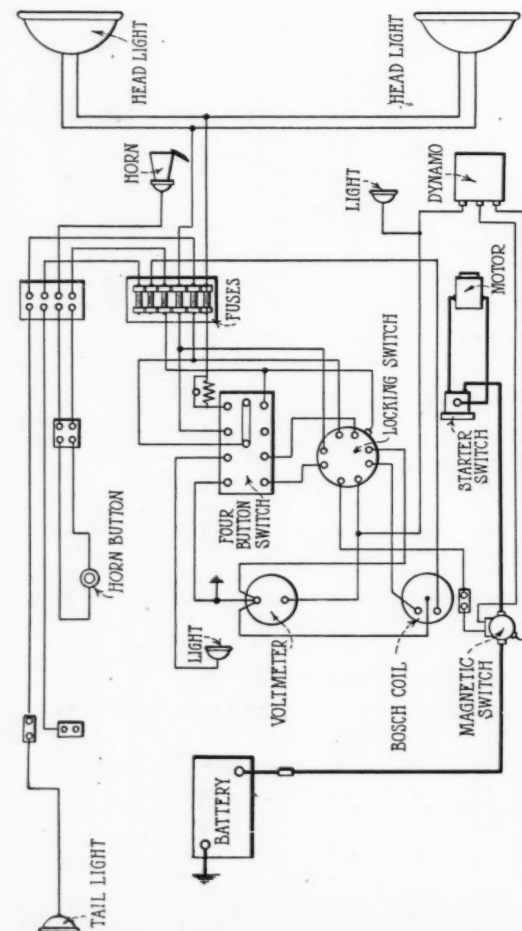
Motor Age Presents Here the 1919 Average Car



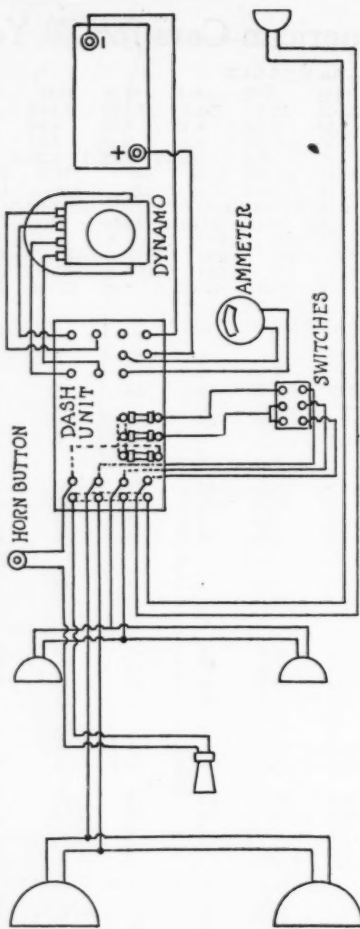
COMPARISONS with the corresponding page in MOTOR AGE of a year ago, on which the average car for 1918 was reproduced, show various changes here. For instance, the tires are slightly smaller, 33 by 4 as compared with 34 by 4 in 1918; the wheelbase is a trifle shorter, 119.8 as compared to 120.7 a year ago. The bore of the engine is slightly more and the stroke,

some shorter. The horsepower is 32.94 this year, against 27.4 last year. The gear ratio is higher, 4.32:1, against 4.22:1. The price is higher, \$2,128 as compared with \$1,822 last year. Further comparisons in the averages of 1918 and 1919 cars appear in the table on the facing page, of course. However, these are those that may be gained from study of the drawings, with the dimensions

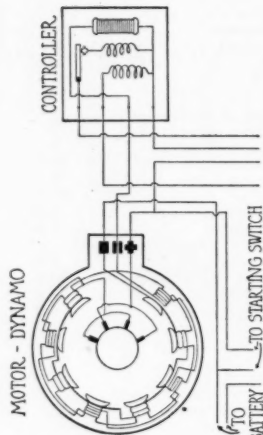
Motor Age Wiring Diagram Chart No. 12



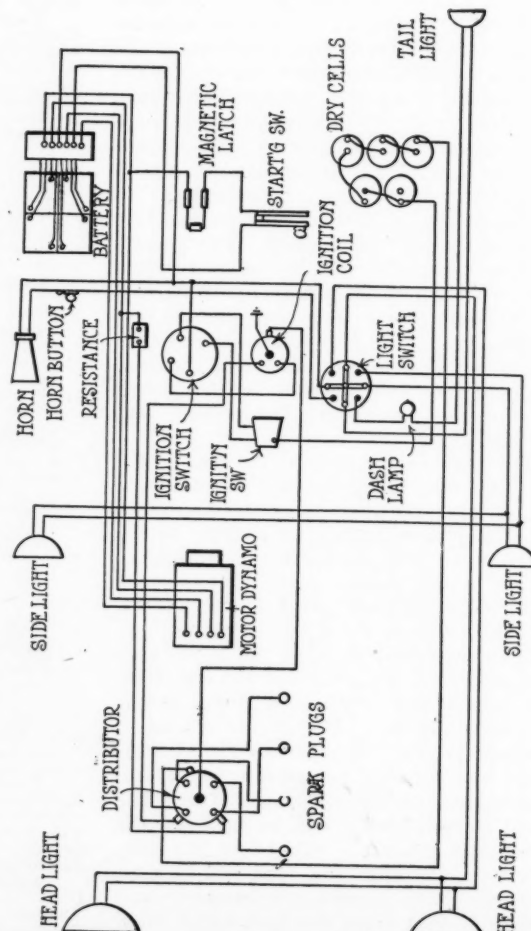
Westinghouse starting and lighting system used on the 1915-1916 Locomobile



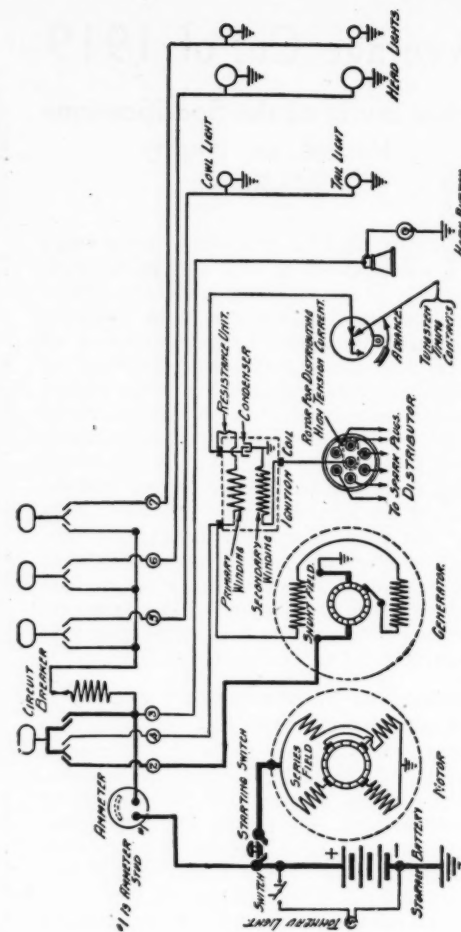
Esterline system on 1913 Stutz



USL motor-generator and internal connections on Mercer



Delco system used on 1913 Cole



Delco starting and lighting system used on 1917 Oldsmobile

Passenger Car and Accessory Exhibitors at Chicago

(Concluded from page 13)

National Mileometer Co., Detroit, Annex. 196-197
 National Refining Co., Chicago, Coliseum. 17
 National Wire Wheel Works, Geneva, N. Y., Coliseum. 96
 New Era Spring & Specialty Co., Grand Rapids, Mich., Coliseum. 75
 Parry Mfg. Co., Indianapolis, Ind., Annex. D-2
 Parker Collapsible Rim Corp., Chicago, Coliseum. 9
 Perfix Radiator Co., Racine, Wis., Coliseum. 36
 Pratt, Wm. E., Mfg. Co., Chicago, Coliseum. 83
 Radium Dial Co., Chicago, Annex. 147-148
 Schrader's, A., Son, Inc., Brooklyn, N. Y., Coliseum. 55
 Simms Magneto Co., East Orange, N. J., Coliseum. 44
 Simplicity Wheel Co., Grand Rapids, Mich., Annex. 118-120
 Simoniz Co., Chicago, Annex. 173
 Sparks-Withington Co., Jackson, Mich., Annex. 109-117
 Splitdorf Electrical Co., Newark, N. J., Coliseum. 59-60, 69-70
 Stahl Rectifier Co., Chicago, Annex. 157-158
 Standard Motor Parts Co., Chicago, Annex. 184-187
 Standox Mfg. Corp., Chicago, Annex. 210
 Stewart Warner Speedometer Corp., Chicago, Annex. 127 to 140
 Stolp Elec. Specialty Co., Chicago, Armory. 1

Stromberg Motor Devices Co., Chicago, Coliseum. 57-58
 Taft Pierce Mfg. Co., Woonsocket, R. I., Coliseum. 39-40
 Trindl Machine Works, Chicago, Annex. 166-167
 Triple Action Spring Co., Chicago, Coliseum. 24-25
 Tuthill Spring Co., Chicago, Coliseum. 14
 Twin Fire Spark Plug Co., Chicago, Annex. 190-191
 U. S. Auto Gear Shift Co., Eau Claire, Wis., Annex. 198-200
 U. S. Auto Supply Co., Chicago, Annex. 178
 Vacuum Oil Co., New York, Coliseum. 37-38
 Van Sicklen Co., Elgin, Ill., Coliseum. 88
 Vesta Accumulator Co., Chicago, Coliseum. 92-93
 Wakefield Brass Co., F. W., Vermillion, Ohio, Annex. 145-146
 Wales-Adamson Co., Chicago, Annex. 143-144
 Waltham Watch Co., Waltham, Mass., Coliseum. 54
 Warner-Patterson Co., Chicago, Coliseum. 66-67
 Weaver Mfg. Co., Springfield, Ill., Annex. 123-126
 Wee Specialty Co., Chicago, Coliseum. 16
 West Steel Casting Co., Cleveland, Ohio, Annex. 201-202
 Wheeler-Schebler Carburetor Co., Inc., Indianapolis, Ind., Coliseum. 22 and 32
 Willard Storage Battery Co., Chicago, Coliseum. 4
 Williams, J. H., Co., Brooklyn, N. Y., Coliseum. 49

Wire Wheel Corp. of America, Buffalo, N. Y., Coliseum. 53

Late Additions

Automotive Parts Co., Indianapolis, Ind., Armory 7.
 Bjorline Mfg. Co., Watertown, S. D., Armory 3.
 American Bureau of Engineering, Chicago, Coliseum 80.
 Grundy Mfg. Co., New York, Armory 6.
 Hayes Wheel Co., Jackson, Mich., Coliseum 35.
 Interstate Electric Co., New Orleans, La., Coliseum 76.
 J & D Tire Co., Charlotte, N. C., Armory 5.
 J. H. Tonneau Shield Co., Chicago, Coliseum 21.
 Lyknu Polish Mfg. Co., Chicago, Armory 2.
 Mazura Mfg. Co., St. Louis, Mo., Annex 179-180.
 Metal Auto Parts Co., Des Moines, Iowa, Annex 181-183.
 Spencer Metal Products Co., Spencer, Ohio, Coliseum 12.
 U. S. Air Compressor Co., Cleveland, Ohio, Armory 30.
 Veeder Mfg. Co., Hartford, Conn., Coliseum 66.
 Visible Measure Gasoline Dispenser Co., Louisville, Ky., Armory 8.
 Western Mfg. Co., Oskaloosa, Iowa, Coliseum 67.
 Western Vulcanizer Mfg. Co., Chicago, Armory 32-33.

N. A. D. A. MEETING PLANS

St. Louis, Mo., Jan. 20—George M. Graham, John N. Willys, Edward S. Jordan, Henry Paulman and Roy D. Chapin—five big ones—are the announced speakers for the N. A. D. A. annual meeting in the La-Salle hotel in Chicago, Jan. 28-29.

S. A. E. PLANS HOME-COMING

Chicago, Jan. 20—A "home-coming supper" is to be one of the features of the S. A. E. meeting at the Morrison hotel, Jan. 30. The afternoon will be devoted to a technical session on tractor, truck and passenger car engines with some original papers on steam and air cooling as applied to motor cars, trucks and tractors.

President C. F. Kettering of the S. A. E. and other speakers will address the diners and E. E. Peake, executive secretary of the National Automobile Dealers' Association, will be toastmaster. An original entertainment is promised to keep the members busy during the period between the professional session and the supper.

DALLAS SHOWS CLOSED CARS

Dallas, Tex., Jan. 20—That the first annual car show held here Jan. 16-18 was a success is attested by the fact that the new 1919 models were seen and inspected by hundreds of dealers throughout Texas and parts of Louisiana, Oklahoma, New Mexico and Arizona. Thousands of prospective buyers took occasion to see the new models.

The Dallas Automobile Association is so pleased with the results of the show that the closed car show will be held annually late in January or early in February.

No record of the number of orders placed is available but in many instances dealers in the Dallas territory made arrangements for from five to ten solid carloads to be shipped direct from the factory. The

show was held in the Adolphus Hotel Annex and twenty-one makes of closed cars were on exhibition.

The show, postponed from the first December dates, was made possible, dealers declare, through the co-operation of manufacturers. Many of the cars were shipped in by express to reach here for the show. The cars on display were Hudson, Grant, Nash, Cole, Reo, Dodge, Oldsmobile, Lexington, Oakland, Franklin, Peerless, Chandler, Apperson, Chevrolet, Studebaker, Willys-Knight, Haynes, Cadillac, Buick, Page and Pierce-Arrow.

But the sale of closed cars is not the only direct result of the show. Dallas wholesalers declare the orders for truck and trailers for use on the cattle ranches of west Texas and New Mexico are unprecedented.

BARNETT JOINS MOTOR LIFE

Chicago, Jan. 20—Frank B. Barnett, for fifteen years Ohio manager for the Class Journal publications, has resigned to become vice-president of Motor Life, New York.

Mr. Barnett takes to his new associates a knowledge of things automotive gained since his early connection with Horseless Age, the first motor car paper in the English language. His acquisition of substantial holdings in the Associated Blue Book Publications, which publishes Motor Life, the Automobile Trade Directory and the Automobile Blue Books, is the gratification of his wish of years to become a principal in a publishing business.

LATE ADDITIONS TO CALENDAR
 Baltimore, Md. Feb. 18-22
 Oklahoma City, Okla. Feb. 18-22
 Peoria, Ill. March 12-18
 Great Falls, Mont. March 17-22
 Norfolk, Neb. March 19-22

NO 1919 MONTREAL SHOW

Montreal, Jan. 17—The Montreal Automobile Trade Association has decided that no motor show will be held under the auspices of the association during 1919, the principal reason being that there is no building in Montreal, available during the year, large enough.

RANDLES LEAVES M. T. C.

Washington, Jan. 17—George E. Randles, vice-president and general manager of the Foote-Burte Mfg. Co., Cleveland, Ohio, who for sixteen months has been director of maintenance for the Motor Transport Corps, has resigned and will return to Cleveland.

Mr. Randles, during his connection with the Motor Transport Service, contributed greatly to the formidable program of that service. Mr. Randles was presented with a gold watch as a token of the high esteem and kind regard of his co-workers.

During his direction of the Maintenance Division Mr. Randles designed and standardized a base repair shop for Army use, which is capable of accomplishing tasks no commercial or manufacturing institution can do. Also he built a crating shop at Camp Holabird, Md., where trucks can quickly be taken apart for shipment.

ACCESSORIES CROWDED OUT

Des Moines, Ia., Jan. 21—Tractors will crowd out the accessories from the Des Moines show this year. So many demands were made for space by the tractor and truck men the managers have decided to dispense with the accessories this year. The Herring Motor Co. will hold a big accessory show in its own building coincident with the Des Moines affair.

Serial Numbers of Passenger Cars

Motor Age Maintenance Data Sheet No. 22

One of a series of weekly pages of information valuable to service man and dealer—Save this page

COMMONWEALTH

Year	Model	Cyls	Price	Serial Numbers
1913	38	4	\$975	A1000-A1366
1914	38	4	975	B203-A411
	20	4	495	B001-B174
1915	38	4	1075	A966-B36
	20	4	495	C195-CX17
1916	32	4	895	CX2-C194
1917	40	4	995	D219-D479
1918	40	4	995	DX732-D0883

CRAWFORD

Year	Model	Cyls	Price	Serial Numbers
1912	12-30	4	\$1600	730-840
	12-40	4	2100	
1913	13-30	4	1750	841-926
	13-40	4	2100	
1914	14-30	4 and 6	1750	927-987
	14-40		2100	
1915	15-6-35	6	1850	988-1090
	15-40		2100	
1916	16-40	6	1650	1091-1195
1917	17-40	6	1750	1196-1234
1918	18-40	6	2250	1235-1294

CROW-ELKHART

Year	Model	Cyls	Price	Serial Numbers
1912	52-54-55-56-58	...	...	5200-5600
1913	C-1 C-2 C-3 C-4	...	...	5601-6000
	C-5 C-6 C-8	...	...
1914	D-45 D-42 D-55	...	...	6001-6500
	D-65	...	...
1915	E-45 E-65 E-66	...	...	6501-7200
	E-25	...	...
1916	CE-30 CE-33	...	...	7201-9025
1917	CE-33 CE-35	...	...	9026-13295
1918	K-32 K36	...	...	13926-15292

DIRECT DRIVE

Year	Model	Cyls	Price	Serial Numbers
1918	4	\$900	101-113 demonstrating models only

DIXIE

Year	Model	Cyls	Price	Serial Numbers
1916	L	4	\$895	Under 2200
1917	L	4	995	2200-3500
1918	L S-35	4	995	3500-5000

DODGE

Year	Model	Cyls	Price	Serial Numbers
1915	4	\$785	
1916	4	785	
1917	4	785	
1918	4	885	

DORT

Year	Model	Cyls	Price	Serial Numbers
1916	5A	4	\$650	The 1915 model is numbered 4 and 5;
1917	9 and 6	4	695	the 1916, 5 and 5A and the 1917, 9
1918	....	4	....	and 6 on the brass engine plate
				24369 up

ELCAR

Year	Model	Cyls	Price	Serial Numbers
1916	....	4	\$795	500-2000
1917	....	4	845	2001-6500
				Number on dash plate
1918	E	4	1095	5000-6000
	E	6	1295	10000-11000

ELGIN

Year	Model	Cyls	Price	Serial Numbers
1916	6	6	\$845	6E16
1917	17	6	985	end with 4002
1918	6-E-17	6	1095	4004-7778
				The 1916 model is designated by a
				name plate bearing the inscription
				6E16; the 1917 model by one marked
				6E17. The first 284 1917 cars have
				the letter D before the inscription;
				the others have the letters L or M
				Number on dash at right side

EMPIRE

Year	Model	Cyls	Price	Serial Numbers
1913-14	31	4	\$950	315750-318672
1914	31-40	4	900	405101-406190
1915	33	4	975	331001-333300
	40	4	975	401001-401675
1916-17	45	4	935	451001-452603
	60	6	1695	601001-603412
1917-18	50	4	1125	50001 up
	70	6	1345	70001-70350
	70A	6	1375	70A001-70A710
	73	6	1360	73001-73059

ESSEX

Year	Model	Cyls	Price	Serial Numbers
1918	A-5000 A-34999 A-35000 A-39999

FIAT

Year	Model	Cyls	Price	Serial Numbers
1914	54	4	\$4000	
	55	4	4500	
	56	6	5000	
1915	55	4	5650	
1916	30	4	3750	
	55	4	4850	
	56	6	5350	
1917	....	..	....
1918	E17	4	5500	
	55	4	5500	

F. R. P.

Year	Model	Cyls	Price	Serial Numbers
1914	A-45 and B	4	\$7000	1-100
1915	A-45 and B	4	7000	1-100
1916	A-45 and B	4	7000	1-100
1917	A-45 and B	4	7000	1-100

FORD

Year	Model	Cyls	Price	Serial Numbers
1912	T	4	\$690	65000-147000
1913	T	4	600	147001-314000
1914	T	4	550	314001-517000
1915	T	4	440	517001-855000
1916	T	4	440	855001-1360000
1917	T	4	360	1360001-2112639
1918	T	4	360	2112640-2794481 Nov. 13, 1918

FRANKLIN

Year	Model	Cyls	Price	Serial Numbers
1912	G	4	\$2000	Ser. 4—July 1913-Jan. 1914
	M	6	2800	16861-16894 and 18189-18205
	D & H	6	3500	Ser. 5—Jan.-July 1914-
1913	G	4	2000	16895-17000 and 19000-19510
	M	6	2900	
	D & H	6	3600	
1914	6-30	6	2300	Ser. 6—July 1914-Jan. 1915-
1915	6-30	6	2150	19511-20643 and 18311-18527
1916	Series 8	6	1950	
1917	Series 9	6	1850	Ser. 7—Jan.-July 1915-
1918	Series 9	6	2050	20644-21980 and 18528-18653
				Ser. 8—July 1915-July 1916-
				21981-25234 and 19000-26175
				Number on plate attached to rear sill
				board
				60001 up

GLIDE

Year	Model	Cyls	Price	Serial Numbers
1912	....	4	\$1550	
	45	4	2150	
1913	36-42	4	1690	5000-6999
	45	4	2150	
1914	36-42	4	1840	
1915	30	4	1195	7000-8999
1916	6-40	6	1095	9000-9999
1917	6-40	6	1125	10000 up
				Number on instrument board name
				plate
1918	6-40	6	1495	10000-10550

GRANT

Year	Model	Cyls	Price	Serial Numbers
1914	15	4	\$495	0-3033
1915	T	6	750	5000-7053
1916	V	6	795	10000-14002
1917	K	6	825	15000-27000
1918	G	6	1055	30001-40001
				Number on dash under hood

HAL

Year	Model	Cyls	Price	Serial Numbers
1916	12	12	\$2100	Can be distinguished by straight
				windshields and carpet paneling on
				back of front seat
	12	12	2385	Introduced September, 1916. Can be
				recognized by walnut paneling on
				front seat back
1917	12	12	2600	A new pocket-style tire carrier is
				fitted
1918	25	12	3600	

HAYNES

Year	Model	Cyls	Price	Serial Numbers
1912	20	4	\$1050	
	21	4	2100	3036-4751
	Y	4	3000	
1913	22	4	2250	5000-6550
1914	26	6	2700	6600-8500
1915	30	6	1485	8501-10950
1916	36	6	1485	
	37	6	1585	10951-16000
	41	12	1885	
1917	36	6	1485	
	40	12	1985	16001 up
1918	38	6	1725	
	39	6	1825	29650 up
	40	12	1985	
	41	12	1885	21000 up
	44	12	2785	

Buyer's Guide to Car Body Styles

The prices given herewith are the latest list prices but are subject to change.

The illustrations of the bodies that are listed here are to be found in the section beginning with page 59. Owing to conditions in the industry it has been impossible this year to get this data together in time to list the page number after the body style. The N.A.C.C. horsepower rating is used under "HP."

Seven-Passenger Touring Cars

NAME AND MODEL	PRICE	CYL.	HP.	W.B.	TIRES
American, B.....	\$1865	6	23.44	122	32x4
Anderson, 400-A.....	1750	6	25.35	120	33x4
Apperson, 8-19.....	4000	8	33.80	130	33x4
Buick.....	1785	6	27.34	124	34x4 1/2
Cadillac, 57.....	3220	8	31.25	125	35x5
Case, U.....	2100	6	29.40	125	35x4 1/2
Chandler.....	1795	6	29.40	123	34x4
Cole, 870.....	2595	8	39.20	127	33x5
Cunningham, V-3.....	4250	8	45.00	132	35x5
Daniels, B.....	3750	8	33.80	127	34x4 1/2
Davis, H.....	1685	6	25.35	119	34x4
Davis, J.....	2050	6	29.40	124	34x4 1/2
Dorris, 6-80.....	3500	6	38.40	132	35x5
Geronimo.....	1595	6	23.44	122	32x4
Haynes, 46.....	12	36.30	127	34x4 1/2	
Haynes, 45.....	2485	6	29.40	127	34x4 1/2
Holmes.....	2900	6	29.40	126	34x4 1/2
Hudson, M.....	On App.	6	29.40	125 1/2	35x4 1/2
Jones.....	2100	6	29.40	125	34x4
Jordan, Suburban.....	2775	6	29.40	127	33x4 1/2
King, F.....	2150	8	28.80	120	34x4
Kissel Kar, Silver Special.....	2550	6	27.50	124	32x4 1/2
Lexington, R-19.....	1785	6	25.35	122	34x4
Locomobile, 38.....	5500	6	43.35	139	35x5
Locomobile, 48.....	6600	6	48.60	142	35x5
Marmon, 34.....	3950	6	33.75	136	32x4 1/2
McFarlan, 127.....	4300	6	48.60	136	35x5
Mitchell, C-42.....	1525	6	29.40	127	34x4
Moline-Knight, G.....	2500	4	25.60	122	35x4 1/2
Moon, 6-66.....	2500	6	29.40	125	35x4 1/2
Nash, 682.....	1640	6	25.35	127	34x4 1/2
National Highway, 6.....	2450	6	29.40	128	34x4 1/2
National Highway, 12.....	3050	12	39.68	128	34x4 1/2
Oldsmobile, 45-A.....	1700	8	26.45	120	34x4
Owen-Magnetic, O-36.....	4200	6	25.35	127	35x5
Owen-Magnetic, W-42.....	5500	6	38.40	142	35x5
Packard, 3-25.....	4800	12	43.20	128	35x5
Packard, 3-25, Salon.....	4800	12	43.20	128	35x5
Packard, 3-35.....	5150	12	43.20	136	35x5
Packard, 3-35, Salon.....	5150	12	43.20	136	35x5
Paige, 6-55, Essex.....	2060	6	29.40	127	34x4 1/2
Patterson, 6-46.....	1625	6	25.35	120	33x4
Peerless, 56.....	2760	8	33.80	125	34x4 1/2
Pierce-Arrow, 48-B-5.....	3500	6	48.60	142	35x5
Premier, 6-C.....	2585	6	27.34	125 1/2	32x4 1/2
Revere.....	3850	4	30.63	131	32x4 1/2
Roamer, 6-54.....	On App.	6	29.40	128	32x4
Singer, 19.....	5000	6	38.40	139	35x5
Standard, G.....	2750	8	33.80	127	34x4 1/2
Stearns, SKL-4.....	2405	4	22.50	125	34x4 1/2
Studebaker, EG.....	1985	4	36.04	126	33x4 1/2
Stutz, G.....	2850	4	30.63	130	32x4 1/2
Westcott, 18-A.....	2590	6	29.40	125	32x4 1/2
White.....	Data not available				
Willis-Knight, 88-4.....	1725	4	27.23	121	34x4 1/2
Winton Six, 22.....	3850	6	48.60	138	35x5
Winton Six, 22-A.....	3200	6	33.75	128	35x5

Six-Passenger Touring Cars

Austin.....	\$4,250	12	39.68	142	34x4 1/2
Biddle, H.....	3,000	4	22.50	121	32x4
Cunningham, V-3.....	4,750	8	45.00	142	35x5
Daniels, B.....	3,750	8	33.80	127	34x4 1/2
Locomobile, 38.....	5,500	6	43.35	142	35x5
Locomobile, 48.....	6,600	6	48.60	142	35x5
Mercer, Series 4.....	4,500	4	22.50	132	...
Stephens, 74-76.....	1,850	4	25.35	118	32x4
Stutz, G.....	2,850	4	30.63	130	32x4 1/2
Winton, 22.....	3,850	6	48.60	138	35x5
Winton, 22-A.....	3,200	6	33.75	128	35x5

Five-Passenger Touring Cars

Allen, 41.....	\$1195	4	22.50	112	32x3 1/2
American, B.....	1765	6	23.44	122	32x4
Anderson, 400 C.....	1675	6	25.35	120	33x4

Five Passenger Touring Cars—Continued

NAME AND MODEL	PRICE	CYL.	HP.	W.B.	TIRES
Auburn, 6-39.....	1595	6	25.35	120	33x4
Briscoe, 4-24.....	885	4	15.20	104	30x3 1/2
Buick.....	1495	6	27.34	118	34x4 1/2
Campbell, C-4.....	1000	4	24.03	110	30x3 1/2
Chalmers, 35-C.....	1565	6	25.35	117	32x4
Chevrolet, F.A.5-F.A.2.....	1045	4	21.76	108	32x3 1/2
Chevrolet, 4-90.....	735	4	21.76	102	30x3 1/2
Columbia, C.....	1600	6	25.35	115	32x4
Comet, C-51.....	1685	6	29.40	125	33x4
Commonwealth, 4-40.....	1095	4	19.60	115	32x3 1/2
Crow-Elkhart, K-36.....	1095	4	19.60	115	32x3 1/2
Daniels, B.....	3750	8	33.80	127	34x4 1/2
Dixie Flyer, L, Series 35.....	1095	4	16.90	112	32x3 1/2
Dodge Brothers.....	1085	4	24.03	114	32x3 1/2
Dort, 15.....	925	4	19.60	105 1/2	30x3 1/2
Elcar.....	1375	6	25.35	116	33x4
Elcar.....	1175	4	19.60	116	32x3 1/2
Elgin, H.....	1395	6	23.44	118	32x4
Essex, A, Phaeton.....	1395	4	18.23	108 1/2	33x4
Ford, T.....	625	4	22.50	100	30x3 1/2
Franklin, 9.....	2450	6	25.35	115	33x4 1/2
Geronimo.....	1550	6	23.44	122	32x4
Glide, 6-40.....	1655	6	23.44	119	34x4
Grant, G.....	1220	6	21.60	114	32x3 1/2
Harroun, A-1.....	995	4	16.90	106	30x3 1/2
Hatfield, A.....	1180	4	22.50	115	32x4
Hollier, 208.....	1595	6	25.35	116	32x4
Hollier, 198.....	1695	8	33.80	112	34x4
Hupmobile, R.....	1335	4	16.90	112	32x4
KlineKar, 6-42.....	1865	6	25.35	121	35x4
Lexington.....	1785	6	25.35	122	34x4
Liberty, 10-B.....	1570	6	25.35	115	32x4
Maibohm, B, Phaeton.....	1290	6	23.44	116	32x3 1/2
Marmon, 34.....	3900	6	33.75	136	32x4 1/2
Maxwell, 25.....	895	4	21.03	108	30x3 1/2
Mitchell, D-40.....	1275	6	25.35	120	34x4
Moline-Knight, L.....	2000	4	22.50	117	34x4
Moline-Knight, L, De Luxe.....	2375	4	22.50	117	34x4
Monitor, M and O.....	14.5	6	29.40	117	33x4
Moon, 6-38.....	1485	6	19.84	114	32x3 1/2
Moore, C.....	1045	4	22.50	106	30x3 1/2
Nash, 681.....	1490	6	25.35	121	33x4
Oakland, 34-B.....	1075	6	19.70	112	32x4
Oldsmobile, 37-A.....	1295	6	18.99	112	32x4
Olympian, 45.....	1240	4	16.90	112	32x3 1/2
Overland, 90.....	985	4	18.23	106	31x4
Packard, 3-25, Phaeton.....	4800	12	43.20	128	35x5
Paige, 6-39.....	1555	6	23.44	117	33x4
Patterson, 6-46.....	1595	6	25.35	120	33x4
Pierce Arrow, 48.....	6400	6	48.60	142	35x5
Piedmont.....	1095	4	19.60	114	32x3 1/2
Piedmont.....	1545	6	25.35	120	32x4
Pilot, 6-45.....	1495	6	23.44	119	32x4
Reo, T.....	1395	4	27.23	120	34x4
Saxon, Y-18.....	1195	6	19.84	112	32x3 1/2
Scripps-Booth, 6-39.....	1295	6	25.50	112	32x4
Seneca, H.....	990	4	15.63	102	30x3 1/2
Stearns, SKL-4.....	2100	4	22.50	125	34x4 1/2
Stephens, 75.....	1675	6	25.35	118	32x4
Studebaker, EH.....	1685	6	29.40	119	32x4
Studebaker, LH.....	1125	4	19.60	112	32x3 1/2
Templar, 445.....	2185	4	18.23	118	32x4
Tulsa, D.....	1150	4	19.60	117 1/2	33x4
Vellie, 38.....	1465	6	25.35	115	32x4
Vernon, 819, Phaeton.....	1250	8	22.05	115	31x4
Vernon, Phaeton.....	...	4	15.63	...	30x3 1/2
Winton, 22.....	3850	6	48.60	138	35x5
Winton, 22-A.....	3150	6	33.75	128	35x5

Four-Passenger Touring Cars

Apperson, 8-18.....	\$4,000	8	33.80	130	33x4
Biddle, H.....	2,750	4	22.50	121	32x4
Cadillac, 57, Phaeton.....	3,220	8	31.25	125	35x5
Daniels, B.....	3,750	8	33.80	127	34x4 1/2
Davis.....	1,685	6	29.40	119	34x4 1/2
Dorris, 6-80.....	3,500	6	38.40	132	35x5
Hudson, M, Phaeton.....	...	6	29.40	125 1/2	35x4 1/2
Jordan, Sport Marine.....	2,775	6	29.40	127	33x4 1/2
King, F, Foursome.....	2,350	8	28.80	120	32x4 1/2
Kissel Kar, Tourster.....	2,550	6	27.50	124	32x4 1/2
KlineKar, 6-42, Sporttour.....	1,865	6	25.35	121	35x4
Liberty, 10-B, Sport Tour.....	1,720	6	25.35	115	32x4
Locomobile, 38.....	5,700	6	48.60	142	35x5
Locomobile, 48.....	6,700	6	48.60	142	35x5
Mercer, Series 4.....	4,500	4	22.50	132	32x4 1/2

Buyer's Guide to Car Body Styles—Continued

Four Passenger Touring Cars—Continued

NAME AND MODEL	PRICE	CYL.	HP.	W.B.	TIRES
National Hy., 6, Phaeton...	2,450	6	29.40	128	34x4 1/2
National Hy., 12, Phaeton...	3,050	12	39.68	128	34x4 1/2
Paige, 6-55...	2,165	6	29.40	127	34x4 1/2
Pierce-Arrow, 48...	6,400	6	48.60	142	35x5
Pilot, 6-45...	1,545	6	23.44	119	32x4
Revere...	3,850	4	30.63	131	32x4 1/2
Roamer, 6-54...	On app.	6	29.40	128	32x4
Singer, 19...	\$5,000	6	38.40	139	35x5
Stutz, G...	2,850	4	30.63	130	32x4 1/2
Templar, 445...	2,185	4	18.23	118	32x4
Winton, 22...	3,850	6	48.60	138	35x5
Winton, 22-A...	3,150	6	33.75	128	35x5

Limousines—Continued

NAME AND MODEL	PRICE	CYL.	HP.	W.B.	TIRES
Packard, 3-35, 7-pass....	6,700	12	43.20	136	35x5
Packard, 3-25, 7-pass....	6,350	12	43.20	128	35x5
Paige, 6-55, 7-pass....	3,830	6	29.40	127	35x4 1/2
Peerless, 56...	3,720	8	33.80	125	34x4 1/2
Pierce-Arrow, 48, B-5, Brougham...	7,800	6	48.60	142	35x5
Pierce-Arrow, 48-B-5, Sub-urban...	8,000	6	48.60	142	35x5
Singer, 19...	7,200	6	38.40	139	35x5
Standard, G, 7-pass....	4,000	8	33.80	125	34x4 1/2
Stearns, SKL 4, 7-pass....	3,700	4	22.50	125	34x4 1/2
Willys-Knight, 88-4...	2,750	4	27.23	121	34x4 1/2
Winton, 22, 7-pass....	5,100	6	48.60	138	35x5
Winton, 22-A, 7-pass....	4,400	6	33.75	128	35x5

Four-Passenger Roadsters

Anderson, 400-G, Sport...	\$2,450	6	29.40	120	33x4
Auburn, 6-39...	1,595	6	25.35	120	33x4
Austin...	4,250	12	39.68	142	34x4 1/2
Case, U...	2,100	6	29.40	125	35x4 1/2
Chandler...	1,795	6	29.40	123	34x4
Chandler, Dispatch Car...	1,875	6	29.40	123	34x4
Cole, 872...	2,595	8	39.20	127	33x5
Columbia, CD and CS, Sport...	1,095	4	19.60	115	32x3 1/2
Commonwealth, 4-40...	1,155	4	19.60	115	32x3 1/2
Crow-Elkhart, K 36, De Luxe...	4,250	8	45.00	132	35x5
Cunningham, V-3...	1,685	6	25.35	119	34x4
Davis...	1,095	4	16.90	112	32x3 1/2
Dixie Flyer, L...	925	4	19.60	105 1/2	30x3 1/2
Dort, 15...	1,375	6	25.35	116	33x4
Elcar, Sport...	1,375	6	25.35	116	33x4
Elcar, Chummy...	1,175	4	19.60	116	32x3 1/2
Elcar, Chummy...	1,175	4	19.60	116	32x3 1/2
Elgin, H, Scout...	1,495	6	23.44	118	33x4
Franklin, 9...	2,450	6	25.35	115	33x4 1/2
Geronimo...	1,550	6	23.44	122	32x4
Glide, 6-40...	1,655	6	23.44	119	34x4
Hatfield, A...	1,190	4	22.50	115	32x4
Haynes, 48...	2,485	12	36.30	127	34x4 1/2
Haynes, 45...	2,350	6	29.40	127	34x4 1/2
Jones, Sport...	2,350	6	29.40	125	32x4 1/2
Kissel Kar, Silver Special, Speedster...	2,550	6	27.50	124	32x4 1/2
KlineKar, 6-42, Shamrock...	1,865	6	25.35	121	33x4
Marmon, 34...	3,950	6	33.75	136	32x4 1/2
McFarlan, 125...	4,500	6	48.60	136	35x5
Moline-Knight, L...	2,000	4	22.50	117	34x4
Moline-Knight, L, De Luxe...	2,375	4	22.50	117	34x4
Moline-Knight, G...	2,500	4	25.60	122	35x4 1/2
Monitor, M and O...	1,475	6	29.40	117	33x4
Moon, 6-66...	2,500	6	29.40	125	35x4 1/2
Nash, 683...	1,490	6	25.35	121	32x4
National Hy., 6...	2,450	6	29.40	128	34x4 1/2
National Hy., 12...	3,050	12	39.68	128	34x4 1/2
Oldsmobile, 37 A...	1,295	6	18.99	112	32x4
Oldsmobile, 45 A, Pace Maker...	1,700	8	26.45	120	33x4 1/2
Packard, 3-25, Runabout...	4,800	12	43.20	128	35x5
Paterson, 6-48...	1,595	6	25.35	120	33x4
Peerless, 56...	2,760	8	33.80	125	34x4 1/2
Piedmont, Club...	1,095	4	19.60	114	32x3 1/2
Piedmont, Club...	1,545	6	25.35	120	32x4
Pierce-Arrow, 48...	6,400	6	48.60	142	35x5
Pilot, 6-45...	1,545	6	23.44	119	32x4
Premier, Foursome...	2,585	6	27.34	125 1/2	32x4 1/2
Roamer, 6-54...	On app.	6	29.40	128	32x4
Standard, G...	2,750	8	33.80	127	34x4 1/2
Stearns, SKL 4...	2,100	4	22.50	125	34x4 1/2
Studebaker, EH, Club...	1,685	4	29.40	119	32x4
Westcott, S-18A...	2,190	6	29.40	125	32x4 1/2
Winton, 22...	3,850	6	48.60	138	35x5
Winton, 22-A...	3,150	6	33.75	128	35x5

Limousines

Austin, 7-pass....	\$5,750	12	39.68	142	34x4 1/2
Cadillac, 57, 7-pass....	4,395	8	31.25	132	35x5
Chalmers, 35-C...	2,925	6	25.35	117	32x4
Chandler, 7-pass...	3,095	6	29.40	123	34x4
Cunningham, V-3, 6-pass...	6,000	8	45.00	142	35x5
Dodge Brothers, 5-pass...	1,650	4	24.05	114	33x4
Dorris, 6-80, 7-pass...	4,850	6	38.40	132	35x5
Franklin, 9, 7-pass...	3,400	6	25.35	115	33x4 1/2
Hudson, M, 7-pass...	6,900	6	29.40	125 1/2	35x4 1/2
Locomobile, 38, 7-pass...	7,100	6	43.35	137	35x5
Locomobile, 38, 7-pass...	7,100	6	43.35	137	35x5
Locomobile, 48, 7-pass...	7,700	6	48.60	142	35x5
Locomobile, 48, 7-pass...	7,900	6	48.60	142	35x5
Marmon, 34, 7-pass...	6,500	6	33.75	136	32x4 1/2
McFarlan, 138, 7-pass...	5,800	6	48.60	136	35x5
Mitchell, C-42, 7-pass...	2,850	6	29.40	127	34x4
Owen Magneto, D-36, 7-pass...	5,000	6	25.35	136	35x5

Two-Passenger Roadsters

American, B...	\$1,835	6	23.44	122	32x4
American Beauty...	2,000	6	23.44	121	33x4 1/2
Anderson, 400 F...	2,450	6	29.40	120	33x4
Biddle, H, Speedway Special...	2,850	4	22.50	121	32x4
Briscoe, 4-24, Runabout...	885	4	15.20	104	30x3 1/2
Cadillac, 57...	3,220	8	31.25	125	35x5
Chalmers, 35-C...	1,565	6	25.35	117	32x4
Chevrolet, F.A. 5-F.A-2...	1,045	4	21.76	108	32x3 1/2
Chevrolet, 4-90...	715	4	21.76	102	30x3 1/2
Cole, 871...	2,595	8	39.20	127	33x5
Crow-Elkhart, K-36...	1,095	4	19.60	115	32x3 1/2
Dodge Brothers...	1,085	4	24.03	114	32x3 1/2
Ford, T, Runabout...	500	4	22.50	100	30x3 1/2
Franklin, 9...	2,400	6	25.25	115	33x4 1/2
Geronimo...	1,550	6	23.44	122	32x4
Grant, G...	1,220	6	21.60	114	32x3 1/2
Harvard, 4-20...	850	4	14.40	100	28x3
Harroun, A-1...	1,095	4	16.90	106	30x3 1/2
KlineKar, 6-42, Runabout...	1,865	6	25.35	121	33x4
Liberty, 10-B...	1,570	6	25.35	115	32x4
McFarlan, 122...	4,300	6	48.60	136	35x5
Mercer, 4, Runabout...	4,350	4	22.50	115	32x4 1/2
Mercer, 4, Runabout...	4,200	4	22.50	115	32x4 1/2
Monitor, M and O...	1,475	6	29.40	117	33x4
National, Hy. 12, Speedster...	3,150	12	39.68	128	34x4 1/2
Oakland, 34-B...	1,075	6	19.70	112	32x4
Oldsmobile, 37...	1,295	6	18.99	112	32x4
Olympian, 45...	1,240	4	16.90	112	32x3 1/2
Paige, 6-40...	1,550	6	23.44	117	33x4
Pierce-Arrow, 48, Runabout...	6,400	6	48.60	142	35x5
Revere, C...	3,850	4	30.63	131	32x4 1/2
Roamer, 6-54...	On app.	6	29.40	128	32x4
Saxon, Y-18...	1,195	6	19.84	112	32x3 1/2
Singer, 19...	5,000	6	38.40	139	35x5
Standard, G...	2,750	8	33.80	127	34x4 1/2
Stephens, 74, Speedster...	1,750	6	25.35	118	32x4
Stutz, G, Bearcat...	2,750	4	30.63	120	32x4 1/2
Stutz, G...	2,750	4	30.63	130	32x4 1/2
Templar, 445...	2,385	4	18.23	118	32x4
Velle, 38...	1,465	6	25.35	116	32x4
Winton, 22...	3,850	6	48.60	138	35x5
Winton, 22-A...	3,150	6	33.75	128	35x5

Odd-Capacity Roadsters

Anderson, 400 F, 5-pass...	\$2,450	6	29.40	120	33x4
Buick, 3-pass...	1,495	6	27.34	118	34x4 1/2
Hupmobile, R, 3-pass...	1,335	4	16.90	112	32x4
KlineKar, 6-42, 3-pass...	1,865	6	25.35	121	33x4
Maxwell, 25, 3-pass...	895	4	21.03	108	30x3 1/2
Mitchell, D-40, 3-pass...	1,275	6	25.35	120	32x4
Mitchell, C-42, 5-pass...	1,525	6	29.40	127	34x4
Pierce-Arrow, 48, Runabout, 3-pass...	6,400	6	48.60	142	35x5
Reo, N, 3-pass...	1,395	4	27.23	120	34x4
Scripps-Booth, 3-pass...	1,295	6	25.50	112	32x4
Winton, 22, 3-pass...	3,850	6	48.60	138	35x5
Winton, 22-A, 3-pass...	3,150	6	33.75	128	35x5

Convertible Sedans

Anderson, 400-E...	\$2,550	6	25.35	120	33x4
Chandler...	2,495	6	29.40	123	34x4
Grant, G...	1,500	6	21.60	114	32x3 1/2
Maxwell, 25, all weather...	1,005	4	21.03	108	30x3 1/2
Paige, 6-55...	2,950	6	29.40	127	34x4 1/2
Roamer, 6-54...	On App.	6	29.40	128	32x4
Winton, 22-A...	4,200	6	33.75	128	35x5

Buyer's Guide to Car Body Styles—Concluded

Open Sedans

NAME AND MODEL	PRICE	CYL.	HP.	W.B.	TIRES
Chevrolet, 4-90.....	\$1,185	4	21.76	102	31x4
Dodge Brothers.....	1,650	4	24.03	114	33x4
Elgin H.....	1,950	6	23.44	118	33x4
Grant G, all weather.....	1,745	6	21.60	114	32x3 1/2
Moline-Knight, L.....	2,500	4	22.50	117	34x4
National, Hy 6.....	3,120	6	29.40	128	34x4 1/2
National, Hy 12.....	3,720	12	39.68	128	34x4 1/2
Velle, 38.....	2,025	6	25.35	115	32x4

Broughams and Town Cars

Biddle, H.....	\$3,900	4	22.50	121	32x4
Biddle, H, Town Car.....	4,000	4	22.50	121	32x4
Cole, 877.....	3,798	8	39.20	127	32x4
Crow-Elkhart, K36.....	1,155	4	19.60	115	32x3 1/2
Cunningham, V-3.....	6,000	8	45.00	142	35x5
Daniels, B.....	6,000	8	33.80	127	34x4 1/2
Haynes, 46.....	3,750	12	36.30	127	34x4 1/2
Jordan, Town Car.....	3,000	6	29.40	127	33x4 1/2
Liberty, 10-B.....	6,450	6	25.35	115	32x4
Marmon, 34.....	2,850	6	33.75	136	32x4 1/2
Mitchell, C-42.....	3,330	6	29.40	127	34x4
Paige, 6-55.....	On App.	6	29.40	127	34x4 1/2
Roamer, 6-54.....	7,300	6	29.40	128	32x4
Singer, 19.....	2,500	6	38.40	139	35x5
Velle, 38, Town Car.....	2,500	6	25.35	115	32x4

Landaulets

Locomobile, 38.....	\$7,000	6	43.35	139	35x5
Locomobile, 48.....	7,800	6	48.60	142	35x5
Packard, 3-35.....	6,750	12	43.20	136	35x5
Packard, 3-25.....	6,400	12	64.00	128	35x5

Coupes and Cabriolets

Bulck.....	\$1,985	6	27.34	118	34x4 1/2
Cadillac, Victoria.....	3,690	8	31.25	125	35x5
Chalmers, 35-C, Cabriolet.....	1,110	6	25.35	117	32x4
Chevrolet, 4-90.....	3,795	4	21.76	102	30x3 1/2
Cole, 873.....	1,850	8	39.20	127	33x5
Daniels, B, Cabriolet.....	1,650	4	24.03	114	33x4
Dodge Brothers.....	3,850	6	38.40	132	35x5
Dorris, 6-80, Cabriolet.....	1,355	4	19.60	105 1/2	30x3 1/2
Dort, 15.....	650	4	22.50	100	30x3 1/2
Ford, T.....	3,300	6	25.35	115	33x4 1/2
Franklin, 9, Brougham.....	1,725	6	21.60	114	32x3 1/2
Grant, G.....	3,100	12	36.30	127	34x4 1/2
Haynes, 46.....	3,100	6	29.40	127	34x4 1/2
Haynes, 46.....	3,100	6	29.40	125 5/8	35x4 1/2
Hudson, M, Cabriolet.....	3,500	6	29.40	126	34x4 1/2
Hudson, M, Cabriolet.....	2,100	4	16.90	112	32x4
Hupmobile, R.....	3,750	6	29.40	127	33x4 1/2
Jordan, Brougham.....	2,650	6	25.35	122	34x4
Lexington, B-19.....	1,890	6	23.44	116	32x3 1/2
Liberty, 10-B.....	1,520	4	21.03	108	30x3 1/2
Malbohm, B, Brougham.....	1,850	6	25.35	120	32x4
Maxwell, 25.....	2,500	4	22.50	117	34x4
Mitchell, D-40.....	2,250	6	25.35	121	34x4 1/2
Moline-Knight, L.....	1,650	6	19.70	112	32x4
Nash, 685.....	1,895	6	18.99	112	32x4
Oakland, 34-B.....	1,490	4	16.90	112	32x3 1/2
Oldsmobile, 37.....	6,150	12	43.20	128	35x5
Olympian, 45.....	2,950	6	29.40	127	34x4 1/2
Packard, 3-25.....	1,885	6	23.44	117	33x4
Paige, 6-55.....	3,320	8	33.80	125	34x4 1/2
Peerless, 56.....	2,175	4	27.23	120	34x4
Reo.....	Op App.	6	29.40	128	32x4
Roamer, 6-54.....	1,985	6	25.50	112	32x4
Scripps-Booth.....	3,800	8	33.80	127	34x4 1/2
Standard, G.....	2,025	6	25.35	115	32x4
Velle, 38.....	1,925	6	25.35	115	32x4
Velle, 38, Cabriolet.....	3,190	6	29.40	125	32x4 1/2
Westcott, S-18 A.....	2,650	4	27.23	121	34x4 1/2
Willys-Knight, 88-4.....	4,850	6	48.60	138	35x5
Winton, 22.....	4,150	6	33.75	128	35x5

Convertible Coupes

NAME AND MODEL	PRICE	CYL.	HP.	W.B.	TIRES
Chandler.....	\$2,395	6	29.40	123	34x4
Maxwell, 25, all weather..	980	4	21.03	108	30x3 1/2

Berlines

Cole, 875, Sedan.....	3,595	8	39.20	127	35x5
Hudson, M, Tourlimousine.....	2,640	6	25.35	115	32x4
Liberty, 10-B.....	6,900	12	43.20	136	35x5
Packard, 3-35, Imperial Limousine.....	.....	12	43.20	128	35x5
Packard, 3-25, Imperial Limousine.....	.....	12	43.20	128	35x5

Sedans

Allen, 41.....	\$1,695	4	22.50	112	33x4
Austin.....	5,500	12	39.68	142	34x4 1/2
Biddle, H, Salon.....	4,400	4	22.50	121	32x4
Bulck.....	2,195	6	27.34	118	34x4 1/2
Bulck.....	2,585	6	27.34	118	34x4 1/2
Chalmers, 35-C.....	2,250	6	25.35	117	32x4
Cole, 874.....	3,695	8	39.20	127	33x5
Columbia, CS.....	2,445	6	25.35	115	32x4
Comet, C-51.....	2,500	6	29.40	125	33x4
Crow-Elkhart, K-36.....	1,445	4	19.60	115	32x3 1/2
Daniels, B, Suburban.....	5,500	8	33.80	127	34x4 1/2
Dixie Flyer, 35.....	1,450	4	16.90	112	32x3 1/2
Dort, 15.....	1,355	4	19.60	105 1/2	30x3 1/2
Dort, 15, Sedanet.....	1,090	4	19.60	105 1/2	30x3 1/2
Elcar.....	1,795	6	25.35	116	33x4
Elcar.....	1,625	4	19.60	116	32x3 1/2
Ford, T.....	775	4	22.50	100	30x3 1/2
Franklin, 9.....	3,350	6	25.35	115	33x4 1/2
Haynes, 45.....	3,350	6	29.40	127	34x4 1/2
Haynes, 46.....	.....	12	36.30	127	34x4 1/2
Holmes, 2-door.....	3,900	6	29.40	126	34x4 1/2
Holmes, 4-door.....	4,100	6	29.40	126	34x4 1/2
Hudson, M.....	.....	6	29.40	125 5/8	35x4 1/2
Hupmobile, R.....	2,135	4	16.90	112	32x4
Jordan, Town Sedan.....	3,750	6	29.40	127	33x4 1/2
Jordan, Opera Sedan.....	4,000	6	29.40	127	33x4 1/2
King, F.....	2,950	8	28.80	120	34x4
Lexington, R-19, Sedanette	2,550	6	25.35	122	34x4
Lexington, R-19.....	2,750	6	25.35	122	34x4
Marmon, 34.....	5,750	6	33.75	136	32x4 1/2
Maxwell, 25.....	1,565	4	21.03	108	30x3 1/2
McFarlan, 136.....	5,600	6	48.60	136	35x5
McFarlan, 135.....	5,800	6	48.60	136	35x5
Mitchell, C-42.....	2,275	6	29.40	127	34x4
Nash, 684.....	2,250	6	25.35	127	34x4 1/2
Oakland, 34-B.....	1,650	6	19.70	112	32x4
Oldsmobile, 37-A.....	1,895	6	18.99	112	32x4
Overland.....	1,495	4	18.23	106	31x4
Owen Magnetic, O-36.....	5,000	6	25.35	136	35x5
Owen-Magnetic, W-42.....	6,500	6	38.40	142	35x5
Packard, 3-35, Brougham.....	6,850	12	43.20	136	35x5
Packard, 3-25, Brougham.....	6,500	12	43.20	128	35x5
Peerless, 56.....	3,530	8	33.80	125	34x4 1/2
Pilot, 6-45.....	2,145	6	23.44	119	32x4
Premier, 6 C.....	3,585	6	27.34	125 1/2	32x4 1/2
Reo.....	2,175	4	27.23	120	34x4
Scripps-Booth, 6-39.....	1,985	6	25.50	112	32x4
Singer, 19.....	7,200	6	38.40	139	35x5
Standard, G.....	3,800	8	33.80	127	34x4 1/2
Stanley, 730.....	4,950	2	.....	130	35x4 1/2
Stearns, SKL 4.....	3,750	4	22.50	125	34x4 1/2
Studebaker, EH.....	2,185	6	29.40	119	32x4
Studebaker, SH.....	1,685	4	19.60	112	32x3 1/2
Templar, 445.....	3,285	4	18.23	118	32x4
Westcott, S-18 A.....	3,190	6	29.40	125	32x4 1/2
Willys-Knight, 88-4.....	2,750	4	27.23	121	34x4 1/2
Winton, 22.....	5,100	6	48.60	138	35x5

Steamers

Doble-Detroit, 7-pass.....	2	.....	135	.....
Stanley, 735, 7-pass.....	2	.....	130	35x4 1/2
Stanley, 735, Roadster, 4-pass.....	2	.....	130	35x4 1/2

1919 Passenger Automobiles Listed

MAKE AND MODEL	Wheel- base	No of Cylinders	Bore and Stroke Inches	Piston Displacement Cubic Inches	Make of Engine	Cylinder Shape	Cam- shaft Drive	Water Circulation	LUBRICATION		CARBURETION		IGNITION			ELECTRIC SYS.		CLUTCH	
									System	Type of Pump	Make of Carbureter	Fuel Feed	Sys- tem	Make	Control	Generator Make	Voltage	Make	Type
Allen.....41	112	4	3 3/4x5	221	Own.....	L... Helical	Ther...	Circ-Spl....	Piston...	Stromberg..	Vacuum	Single...	Conn...	Hand...	Auto-Lite...	6	Borg & Beck..	Plate..	
American.....B	122	6	3 1/2x5	230	Rutenber...	T... Helical	Gear...	Circ-Spl....	Eccentric.	Zenith....	Vacuum	Single...	At Kent.	Hand...	Westinghouse	6	Borg & Beck..	Plate..	
Anderson.....400-C	120	6	3 1/2x5 1/4	303	Continental..	L... Helical	Cent...	Circ-Spl....	Piston...	Zenith....	Vacuum	Single...	.....	Hand...	Westinghouse	6	Borg & Beck..	Plate..
Anderson.....400-A-C-D-E	120	6	3 1/2x4 1/2	224	Continental..	L... Helical	Cent...	Circ-Spl....	Piston...	Zenith....	Vacuum	Single...	Conn...	Hand...	Westinghouse	6	Borg & Beck..	Plate..	
Apperson.....8-18	130	8	3 1/2x5	332	Own.....	L... Helical	Ther...	Pressure....	Gear.....	Johnson...	Vacuum	Single...	Remy...	Hand...	Bijur.....	6	Own.....	Plate..	
Auburn.....6-39	120	6	3 1/2x5	230	Rutenber...	..... Helical	Cent...	Splash-Pres.	.....	Rayfield...	Vacuum	Single...	Remy...	Hand...	Remy.....	6	Borg & Beck..	Plate..
Biddle.....H	121	4	3 3/4x5 1/2	226	Buda.....	L... Helical	Ther...	Circ-Spl....	Gear.....	Zenith....	Vacuum	Single...	Fiseman.	Hand...	G & D.....	6	Warner.....	Disk..	
Briscoe.....B4-24	104	4	3 1/2x5 1/4	164	Own.....	L... Helical	Ther...	Circ-Spl....	Piston...	Dave-Buick.	Gravity.	Single...	Conn...	Hand...	Auto-Lite...	6	Own.....	Cone..	
Buick.....H	118-124	6	3 3/4x4 1/2	242	Own.....	I... Helical	.....	Circ-Spl....	.....	Marvel....	Vacuum	Single...	Delco...	.....	Deico.....	6	Own.....	Disk..
Cadillac.....57	125-132	8	3 1/2x5 1/2	314	Own.....	T... Chain..	Cent...	Pressure....	Gear.....	Own.....	Pressure.	Single...	Delco...	H & A.	Delco.....	6	Own.....	Disk..	
Case.....U	125	6	3 1/2x5 1/4	303	Continental..	L... Helical	Cent...	Splash-Pres.	Piston...	Rayfield...	Vacuum	Single...	Westing.	Hand...	Westinghouse	6	Borg & Beck..	Plate..	
Chalmers.....6-30	117	6	3 1/2x4 1/2	224	Own.....	L... Chain..	Ther...	Splash-Pres.	Gear.....	Stromberg..	Vacuum	Single...	Remy...	Hand...	Auto-Lite...	6	Own.....	Disk..	
Chandler.....	123	6	3 1/2x5	289	Own.....	L... Chain..	Cent...	Circ-Spl....	Piston...	Rayfield...	Vacuum	Single...	Bosch...	Hand...	Westinghouse	6	Borg & Beck..	Plate..	
Chevrolet.....FA	108	4	3 1 1/2x5 1/4	224	Own.....	I... Helical	Cent...	Circ-Spl....	Gear.....	Zenith....	Vacuum	Single...	.....	Hand...	Auto-Lite...	6	Own.....	Cone..
Chevrolet.....4-90	102	4	3 1 1/2x4	171	Own.....	I... Helical	Cent...	Circ-Spl....	Gear.....	Zenith....	Gravity.	Single...	.....	Hand...	Auto-Lite...	6	Own.....	Cone..
Chevrolet.....D	120	8	3 3/4x4	286	Own.....	I... Helical	Cent...	Circ-Spl....	Gear.....	Zenith....	Vacuum	Single...	.....	Hand...	Auto-Lite...	6	Own.....	Cone..
Cole.....870	127	8	3 1/2x4 1/2	346	Northway...	T... Helical	Cent...	Pressure....	Gear.....	Stromberg..	Vacuum	Dual...	Delco...	H & A.	Delco.....	6	Northway...	Cone..	
Columbia.....Cd & CF	115	6	3 1/2x4 1/2	224	Continental..	L... Helical	Cent...	Splash-Pres.	Piston...	Stromberg..	Vacuum	Single...	At Kent.	Hand...	Ward-L....	6	Borg & Beck..	Plate..	
Comet.....C-51	125	6	3 1/2x5	289	Continental..	L... Helical	.....	Circ-Spl....	.....	Rayfield...	Vacuum	Single...	Delco...	Hand...	Dyneto....	6	Borg & Beck..	Plate..
Crow-Elkhart.....K-36	115	4	3 1/2x5	192	Gray.....	I... Spur...	Ther...	Splash-Pres.	Gear.....	Zenith....	Vacuum	Single...	.....	Hand...	Dyneto....	6	Borg & Beck..	Plate..
Cunningham.....V-3	132-142	8	3 3/4x5	442	Own.....	T... Helical	Cent...	Pressure....	Gear.....	Stromberg..	Vacuum	Single...	Delco...	Hand...	Westinghouse	6	Brown-Lipe..	Disk..	
Daniels.....B	127	8	3 1/2x5	332	Hersh-Sp...	L... Helical	Cent...	Pressure....	Gear.....	Zenith....	Vacuum	Single...	.....	Hand...	Westinghouse	6	Brown-Lipe..	Disk..
Dixie.....L-35	112	4	3 1/2x5	166	Lycoming...	L... Helical	Ther...	Circ-Spl....	Eccentric.	Carter....	Vacuum	Single...	Conn...	Hand...	Dyneto....	6	Borg & Beck..	Plate..	
Dodge Brothers.....	114	4	3 3/4x4 1/2	212	Own.....	L... Helical	Cent...	Circ-Spl....	Eccentric.	Stewart...	Vacuum	Single...	.....	H & A.	North East..	12	Own.....	Disk..
Dorris.....6-80	132	6	4 x 5	377	Own.....	I... Helical	Cent...	Pressure....	Gear.....	Stromberg..	Vacuum	Single...	.....	Hand...	Westinghouse	6	Brown-Lipe..	Disk..
Dort.....15	105 1/2	4	3 1/2x5	192	Lycoming...	L... Helical	Ther...	Circ-Spl....	Piston...	Carter....	Gravity.	Single...	Conn...	Hand...	Westinghouse	6	Own.....	Cone..	
Elcar.....4	116	4	3 1/2x5	192	Lycoming...	L... Helical	Ther...	Circ-Spl....	Eccentric.	Carter....	Vacuum	Single...	At Kent.	Hand...	Dyneto....	6	Mechanics...	Disk..	
Elcar.....6	116	6	3 1/2x4 1/2	224	Continental..	L... Helical	Cent...	Splash-Pres.	Eccentric.	Stromberg..	Vacuum	Single...	At Kent.	Hand...	Dyneto....	6	Borg & Beck..	Plate..	
Elgin.....H	118	6	3 1/2x4 1/4	196	Falls.....	F... Helical	Ther...	Splash-Pres.	Gear.....	Stromberg..	Vacuum	Single...	Wagner..	Hand...	Wagner....	6	Borg & Beck..	Plate..	
Essex.....A	108 1/2	4	3 3/4x5	179	Own.....	F... Helical	Ther...	Circ-Spl....	Piston...	Own.....	Vacuum	Single...	Delco...	H & A.	Delco.....	6	Own.....	Disk..	
Ford.....T	100	4	3 3/4x4	177	Own.....	L... Spur...	Ther...	Splash-Grav	.....	Holley-Kng.	Gravity.	Single...	Own...	Hand...	.....	Own.....	Disk..	
Franklin.....	115	6	3 1/2x4	199	Own.....	I... Helical	Air...	Splash-Pres.	Gear.....	Own.....	Vacuum	Single...	At Kent.	Atmte...	Dyneto....	12	Borg & Beck..	Plate..	
Harroun.....A-1	106	4	3 1/2x5 1/4	174	Own.....	I... Helical	Ther...	Splash-Pres.	Piston...	Stromberg..	Vacuum	Single...	At Kent.	Hand...	Remy.....	6	Own.....	Cone..	
Haynes.....45	127	6	3 1/2x5	289	Own.....	L... Helical	Cent...	Circ-Spl....	Piston...	Rayfield...	Vacuum	Single...	.....	Hand...	Leece-N....	6	Borg & Beck..	Plate..
Haynes.....46	127	12	2 3/4x5	356	Own.....	I... Chain..	Cent...	Pressure....	Gear.....	Rayfield...	Vacuum	Single...	.....	Atmte...	Leece-N....	6	Borg & Beck..	Plate..
Hollier.....198	116	8	3 x 4 1/4	240	Own.....	..... Spur...	Ther...	Splash-Pres.	Piston...	Stewart...	Vacuum	Single...	At Kent.	Hand...	Splitdorf...	12	Own.....	Cone..
Hollier.....206	116	6	3 1/2x4 1/2	224	Continental..	..... Spur...	Cent...	Splash-Pres.	Gear.....	Stewart...	Vacuum	Single...	Remy...	Hand...	Splitdorf...	6	Own.....	Cone..
Holmes.....	126	6	3 1/2x4 1/4	240	Own.....	I... Helical	Air...	Splash-Pres.	Gear.....	Newcomb...	Vacuum	Single...	Eiseman.	Atmte...	Dyneto....	12	Brown-Lipe..	Disk..	
Hudson.....M	125 1/2	6	3 1/2x5	289	Own.....	L... Helical	Cent...	Circ-Spl....	Piston...	Own.....	Vacuum	Dual...	Delco...	Hand...	Delco.....	6	Own.....	Disk..	
Hupmobile.....H	112	4	3 1/2x5 1/2	183	Own.....	L... Chain..	Ther...	Pressure....	Gear.....	Stromberg..	Vacuum	Single...	At Kent.	Hand...	Westinghouse	6	Own.....	Disk..	
Jackson.....	118	8	3 x 3 1/2	198	Ferro.....	I... Helical	Ther...	Pressure....	Gear.....	Zenith....	Vacuum	Single...	Remy...	S-A....	Auto-Lite...	6	Borg & Beck..	Plate..	
Jones.....23	125	6	3 1/2x5 1/4	303	Continental..	L... Helical	Cent...	Splash-Pres.	Piston...	Rayfield...	Vacuum	Single...	.....	Hand...	Westinghouse	6	Borg & Beck..	Plate..
Jordan.....	127	6	3 1/2x5 1/4	303	Continental..	L... Helical	Cent...	Splash-Pres.	Piston...	Stromberg..	Vacuum	Single...	.....	H & A.	Bijur.....	6	Borg & Beck..	Plate..
King.....F	120	8	3 x 5	283	Own.....	Chain...	Ther...	Pressure....	Gear.....	Ball.....	Vacuum	Single...	At Kent.	Hand...	Bijur.....	6	Borg & Beck..	Plate..	
Kissel.....	124	6	3 1/2x5 1/2	284	Own.....	L... Helical	Cent...	Splash-Pres.	Gear.....	Stromberg..	Vacuum	Single...	Remy...	Hand...	Remy.....	6	T.W. Warner.	Cont..	

ABBREVIATIONS

2-pt—Two Point
 3/4 Ell—3/4 Elliptic
 3/4 Float—3/4 Floating
 3/4 Plat—3/4 Platform
 Amid—Amidships
 Atmte—Automatic
 B & P—Ball and Plain

B & R—Ball and Roller
 B R & P—Ball, Roller and Plain
 C & C—Cup and Cone
 Cant—Cantilever
 Cent—Centrifugal
 Circ-Spl—Circulating Splash
 Dual-D—Dual Double
 D V—Dual Valve

Ell—Elliptic
 F—1 Valve in Head, 1 in Side
 Float—Floating
 Fric—Friction
 Gear—Gear Pump
 H—Horizontal
 ✓ H & A—Hand and Automatic
 I—I-Head

Imp—Impeller
 K—Knight Type
 L—L-Head
 Mag—Magnetic
 Non-Spl—Non-Circulating Splash
 Opt—Optional
 Plan—Planetary
 Plat—Platform

with Their Technical Specifications

Type	TRANSMISSION							RUNNING GEAR					Make of Steering Gear	Make of Speedometer	Crank-shaft Bearings and Number	BEARINGS			MAKE AND MODEL	
	GEARSET			Final Drive	Torque Taken By	Make of Rear Axle	Rear Axle Type	Gear Ratio on Direct	TIRES		Wheels	Rear Springs				Gearset	Rear Axle	Front Wheel		
	Make	Location	Forward Speeds						Front	Rear										
Plate.	Own.....	Unit M..	3	Sp.B.	Springs...	Adams...	¾ Float.	4.45	32x3½	32x3½	Wood...	S-E....	Ditweiler...	Stewart....	Plain 2..	Ball....	Roller...	Roller...	Allen.....	41
Plate..	Grant-Lees..	Unit M..	3	Sp.B.	Springs...	Salisbury.	Semi-F..	4.42	32x4	32x4	Wood...	S-E....	Gemmer....	Van Sicklen..	Plain 3..	B&R...	B&R...	Ball....	American	
Plate..	Grant-Lees..	Unit M..	3	Sp.B.	Springs...	Columbia.	Float...	3.53	33x4	33x4	Wire...	S-E....	Jacox.....	Stewart....	Plain 3..				Anderson	400-G
Plate..	Durston.....	Unit M..	3	Sp.B.	Springs...	Columbia.	Float...	4.58	33x4	33x4	Wood...	S-E....	Jacox.....	Stewart....	Plain 3..	B&P...		Ball....	Anderson	400-A-C-D-E
Plate..	Own.....	Amid...	3	Sp.B.	Springs...	Own.....	¾ Float.	4.26	34x4½	34x4½	Wire...	¾-ELL...	Own.....	Van Sicklen..	Plain 3..	Roller..	B&R...	Roller..	Apperson	8-18
Plate..	Grant-Lees..	Unit M..	3	Sp.B.	Springs...	Columbia.	¾ Float.	4.42	34x4	34x4	Wood...	S-E....	Jacox.....	Stewart....	Plain....	Ball....	B&R...	Ball....	Auburn	6-39
Disk..	Warner.....	Unit M..	4	Sp.B.	Springs...	American.	Float...	4.41	32x4	32x4	Wire...	S-E....	Gemmer....	Stewart....	Plain 3..	B&R...	Roller..	Roller..	Biddle	H
Cone..	Own.....	Unit X..	3	Bevel.	Tor-A....	Own.....	Semi-F..	4.23	30x3½	30x3½	Wood...	ELL....	Own.....	Stewart....	Plain 2..	BR&P..	Roller..	Ball....	Briscoe	B4-24
Disk..	Own.....	Unit M..	3			Own.....	Float...	4.07	33x4	33x4		Cant....		Stewart....					Buick.....	H
Disk..	Own.....	Unit M..	3	Sp.B.	Springs...	Timken..	Float...	4.44-5.07	35x5	35x5	Wood...	Plat....	Own.....	Van Sicklen..	Plain 3..	B&R...	Roller..	Roller..	Cadillac.....	57
Plate..	Grant-Lees..	Unit M..	3	Sp.B.	Springs...	Columbia.	Float...	4.45	35x4½	35x4½	Wood...	S-E....	Jacox.....	Stewart....	Plain 3..	B&R...	Roller..	Roller..	Case.....	U
Disk..	Own.....	Unit M..	3	Sp.B.	Springs...	Timken..	Semi-F..	4.75	32x4	32x4	Wood...	S-E....	Own.....	Stewart....	Plain 3..	Roller..	Roller..	Roller..	Chalmers	6-30
Plate..	Own.....	Unit M..	3	Sp.B.	Tor-A....	Own.....	¾ Float.	4.40	34x4	34x4	Wood...	S-E....	Opt.....		Ball 3...	Ball....	Ball....	Roller..	Chandler	
Cone..	Own.....	Unit M..	3	Bevel.	Springs...	Own.....	¾ Float.	4.25	32x3½	32x3½	Wood...	Cant....	Warner...		Plain 3..	B&P...	Roller..	Ball....	Chevrolet	FA
Cone..	Own.....	Unit M..	3	Bevel.	Springs...	Own.....	¾ Float.	3.65	30x3½	30x3½	Wood...	Cant....	Warner...		Plain 3..	B&P...	Roller..	Ball....	Chevrolet	4-90
Cone..	Own.....	Unit M..	3	Bevel.	Tor-A....	Own.....	¾ Float.	4.25	34x4	34x4	Wood...	Cant....	Own.....	Stewart....	Plain 3..	R&P...	Roller..	Roller..	Chevrolet	D
Cone..	Northway...	Unit M..	3	Sp.B.	Springs...	Columbia.	Float...	4.45	33x5	33x5	Wood...	S-E....	Gemmer....	Stewart....	Plain 3..	Ball....	B&R...	Roller..	Cole.....	870
Plate..	Durston.....	Unit M..	3	Sp.B.	Springs...	Timken..	¾ Float.	4.75	32x4	32x4	Opt....	Cant....	Gemmer....	Stewart....	Plain 3..	Ball....	Roller..	Roller..	Columbia.....	CD & CF
Plate..	Muncie.....	Unit M..	3	Sp.B.	Rad-Rod.	Columbia.	Semi-F..	4.50	33x4	33x4	Wood...	Cant....	C.A.S....	Stewart....	Plain 3..	Roller..	Roller..	Roller..	Comet.....	C-51
Plate..	Covert.....	Unit M..	3	Bevel.	Springs...	Peru.....	Float...	4.00	32x3½	32x3½	Opt....	S-E....	Ditweiler...		Plain 3..	Ball....	B&R...	Roller..	Crow-Elkhart...	K-36
Disk..	Own.....	Unit M..	3	Sp.B.	Springs...	Timken..	Float...	4.08	35x5	35x5	Opt....	¾-ELL...	Gemmer....		Plain 3..	B&R...	Roller..	Roller..	Cunningham	V-3
Disk..	Brown-Lipe..	Unit M..	3	Sp.B.	Tor-A....	Timken..	Float...	4.08	34x4½	34x4½	Wood...	S-E....	Gemmer....	Stewart....	Plain 3..	Ball....		Roller..	Daniels.....	B
Plate..	Grant-Lees..	Unit M..	3	Sp.B.	Tor-A....	Peru.....		4.75	32x3½	32x3½	Wood...	¾-ELL...	C.A.S....	Van Sicklen..	Plain 2..	BR&P..	B&R...	Ball....	Dixie.....	L-35
Disk..	Own.....	Unit M..	3	Sp.B.	Springs...	Own.....	Float...	4.17	32x3½	32x3½	Opt....	¾-ELL...	Own.....	Johns-Man.	Plain 3..	Ball....	Roller..	Roller..	Dodge Brothers	
Disk..	Own.....	Unit M..	3	Sp.B.	Springs...	Timken..	¾-Float.	4.08	35x5	35x5	Wood...	S-E....	Warner...	Van Sicklen..	Plain 7..	Roller..	Roller..	Roller..	Dorris.....	6-80
Cone..	Mechanics...	Unit M..	3	Bevel.	Springs...	W-Weiss..	¾-Float.	4.07	30x2½	30x3½	Opt....	Cant....	Jacox.....	Stewart....	Plain 2..	Ball....	R&P...	Ball....	Dort.....	15
Disk..	Mechanics...	Unit M..	3	Sp.B.	Springs...	Salisbury.	Float...	4.50	32x3½	32x3½	Wood...	S-E....	Foster.....	Stewart....	Plain 2..	Ball....	Roller..	Roller..	Elcar.....	4
Plate..	Muncie.....	Unit M..	3	Sp.B.	Springs...	Salisbury.	Float...	4.50	33x4	33x4	Wood...	S-E....	Foster.....	Stewart....	Plain 3..	Ball....	Roller..	Roller..	Elcar.....	6
Plate..	Mechanics...	Unit M..	3	Sp.B.	Tor-A....	Adams...	¾-Float.	5.00	33x4	33x4	Wood...	Cant....	C.A.S....	Van Sicklen..	Plain 3..	Roller..	Ball....	Roller..	Elgin.....	H
Disk..	Own.....	Unit M..	3	Sp.B.	Springs...	Timken..	Semi-F..	4.66	32x4	32x4	Wood...	S-E....			Plain 3..	Roller..	Roller..	Roller..	Essex.....	A
Disk..	Own.....	Unit M..	2	Bevel.	Tor-T....	Own.....	Semi-F..	3.64	30x3	30x3½	Wood...	Tr.S-E..	Own.....		Plain 3..	Plain..	Roller..	Ball....	Ford.....	T
Plate..	Own.....	Amid...	3	Sp.B.	Springs...	Own.....	Semi-F..	4.33	33x4½	33x4½	Wood...	ELL....	Own.....	Stewart....	Plain 7..	Ball....	Ball....	Ball....	Franklin	
Cone..	Mechanics...	Unit M..	3	Bevel.	Springs...	Adams...	Float...	4.00	30x3½	30x3½	Wood...	Cant....	Gemmer....	Stewart....	Plain 3..	Ball....	Ball....	Roller..	Harroun.....	A-1
Plate..	Own.....	Unit M..	3	Sp.B.	Springs...	Own.....	¾-Float.	4.42	34x4½	34x4½	Wood...	S-E....	Jacox.....	Stewart....	Plain 3..	Ball....	Ball....	Ball....	Haynes	45
Plate..	Own.....	Unit M..	3	Sp.B.	Springs...	Own.....	¾-Float.	4.07	34x4½	34x4½	Wire...	S-E....	Jacox.....	Stewart....	Plain 3..	Ball....	Ball....	Ball....	Haynes	46
Cone..	Own.....	Unit M..	3	Bevel.	Springs...	Own.....	Semi-F..	4.50	34x4	34x4	Wood...	Cant....	Own.....		Plain 3..	Ball....	Ball....	Ball....	Hollier	198
Cone..	Own.....	Unit M..	3	Sp.B.	Springs...	Own.....	Semi-F..	4.50	32x4	32x4	Wood...	Cant....	Gemmer....		Plain 3..	Ball....	Ball....	Ball....	Hollier	206
Disk..	Brown-Lipe..	Unit M..	3	Sp.B.	Springs...	Timken..	Semi-F..	4.50	34x4½	34x4½	Wood...	ELL....	Gemmer....	Van Sicklen..	Plain 7..	Roller..	Roller..	Roller..	Holmes.....	
Disk..	Own.....	Unit M..	3	Sp.B.	Springs...	Timken..	¾-Float.	*4.90	35x4½	35x4½	Opt....	S-E....	Gemmer....	Stewart....	Plain 4..	Roller..	Roller..	Roller..	Hudson.....	M
Disk..	Own.....	Unit M..	8	Sp.B.	Springs...	Own.....	¾-Float.	4.91	33x4	33x4	Wood...	S-E....	Jacox.....	Van Sicklen..	Plain 3..	R&P...	Roller..	Ball....	Hupmobile.....	R
Plate..	Covert.....	Unit M..	3	Sp.B.	Springs...	Salisbury.	¾-Float.	5.27	37x4	37x4	Wood...	ELL....	Foster.....	Stewart....	Plain 3..	Roller..	Roller..	Ball....	Jackson.....	
Plate..	Brown-Lipe..	Unit M..	3	Sp.B.	Springs...	Timken..	Semi-F..	4.45	34x4	34x4	Opt....	S-E....	Warner...	Stewart....	Plain 3..	Roller..	Roller..	Roller..	Jones.....	28
Plate..	Detroit.....	Unit M..	3	Sp.B.	Springs...	Timken..	¾-Float.	4.08	32x4	32x4	Opt....	S-E....	Gemmer....	Van Sicklen..	Plain 3..	B&P...	Roller..	Roller..	Jordan.....	
Plate..	Own.....	Unit M..	3	Sp.B.	Springs...	Columbia.	Float...	5.00	34x4	34x4	Opt....	Cant....	Jacox.....	Stewart....	Plain 3..	B&R...	Roller..	B&R...	King.....	F
Plate..	T.W. Warner.	Unit M..	3	Sp.B.	Springs...	Own.....	Float...	4.58	32x4½	32x4½	Wire...	¾-ELL...	Jacox.....	Stewart....	Plain 3..	B&P...	Roller..	Roller..	Kissel.....	

Rad-Rd—Radius Rods
 Rev-C—Reversed Cone
 Roll—Roller
 S-A—Semi-Automatic
 S-E—Semi-Elliptic
 Semi-F—Semi-Floating
 Sp.B—Spiral Bevel
 Sp.G—Spiral Gear
 Splash-Press—Splash Pressure

Spur—Spur Gears
 T—T-Head
 Ther—Thermo-Syphon
 Tor-A—Torsion Arm
 Tor-R—Torsion Rod
 Tor-T—Torsion Tube
 Tr S-E—Transverse Semi-Elliptic
 Trans—Transverse
 Unit-M—Unit with Motor

Unit-T—Unit with Torque Tube
 Unit-X—Unit with Axle
 Vib-Dup—Vibrating Duplex
 †—Wire Extra
 *Also available—3.77:1, 4.08:1 and 4.45:1

EQUIPMENT

At Kent—Atwater Kent
 G.B.&S.—Golden, Belknap & Swartz

G. & D.—Gray & Davis
 Hersh-Sp—Herschell-Spillman
 Johns-Man—Johns-Manville
 Leece-N—Leece-Neville
 Mass-Ph—Massnick-Phipps
 Teet-Hart—Teetor-Hartley
 W-Weiss—Walker-Weiss
 Ward-L—Ward Leonard
 West-M—Weston-Mott

1919 Passenger Automobiles Listed with

MAKE AND MODEL	Wheel-base	No. of Cylinders	Bore and Stroke Inches	Piston Displacement Cubic Inches	Make of Engine	Cylinder Shape	Cam-shaft Drive	Water Circulation	LUBRICATION		CARBURETION		IGNITION			ELECTRIC SYS.		CLUTCH	
									System	Type of Pump	Make of Carburetor	Fuel Feed	System	Make	Control	Generator Make	Voltage	Make	Type
Kline.....6-42-H	121	6	3 1/4 x 4 1/2	224	Continental..	L..	Helical.	Gear..	Splash-Pres.	Piston...	Rayfield...	Vacuum.	Single...	Conn...	Hand..	Westinghouse	6	Borg & Beck.	Plate..
Lexington.....R-19	122	6	3 1/4 x 4 1/2	224	Continental..	L..	Helical.	Cent..	Circ-Spl...	Piston...	Rayfield...	Vacuum.	Single...	Conn...	Hand..	Westinghouse	6	Borg & Beck.	Plate..
Liberty.....10-B	115	6	3 1/4 x 4 1/2	224	Continental..	L..	Helical.	Ther..	Splash-Pres.	Piston...	Stromberg..	Vacuum.	Dual...	Delco...	Hand..	Delco.....	6	Borg & Beck.	Plate..
Locomobile.....38-2	139	6	4 1/2 x 5	426	Own.....	T..	Helical.	Cent..	Splash-Pres.	Gear.....	Ball.....	Pressure.	Dual-D..	Berling..	Hand..	Westinghouse	6	Own.....	Disk..
Locomobile.....11-48	142	6	4 1/2 x 5 1/2	525	Own.....	T..	Helical.	Cent..	Splash-Pres.	Gear.....	Ball.....	Pressure.	Dual-D..	Berling..	Hand..	Westinghouse	6	Own.....	Disk..
Maibohm.....B	116	6	3 1/2 x 4 1/4	196	Falls.....	I..	Helical.	Ther..	Splash-Pres.	Piston...	Stromberg..	Vacuum.	Single...	At Kent.	Hand..	Wagner....	6	Borg & Beck.	Plate..
Marmon.....34	136	6	3 1/2 x 5 1/2	340	Own.....	I..	Helical.	Cent..	Pressure...	Gear.....	Stromberg..	Gravity.	Single...	Bosch...	Hand..	Bijur.....	6	Own.....	Cone..
Maxwell.....25	108 1/2	4	3 1/2 x 4 1/2	186	Own.....	L..	Helical.	Ther..	Circ-Spl...	Eccentric.	Johnson...	Vacuum.	Single...		Hand..	Simms-Huff.	12	Own.....	Cone..
McFarlan.....	136	6	4 1/2 x 6	573	Teetor-Hart..	T..	Helical.	Cent..	Splash-Pres.	Piston...	Stromberg..	Vacuum.	Double..	Bosch...	Hand..	Westinghouse	6	Borg & Beck.	Plate..
Mercer.....4	115-132	4	3 1/2 x 6 1/2	298	Own.....	L..	Chain.	Cent..	Pressure...	Gear.....	Ball.....	Vacuum.	Single...	Berling..	Hand..	Westinghouse	6	Own.....	Disk..
Mitchell.....C-42	127	6	3 1/2 x 5	289	Own.....	L..	Helical.	Cent..	Splash-Pres.	Piston...	Rayfield...	Vacuum.	Single...	Remy...	Hand..	Remy.....	6	Own.....	Cone..
Mitchell.....D-40	120	6	3 1/2 x 5	249	Own.....	L..	Helical.	Cent..	Splash-Pres.	Piston...	Rayfield...	Vacuum.	Single...	Remy...	Hand..	Remy.....	6	Own.....	Cone..
Moline-Knight.....G	122	4	4 x 6	302	Own.....	K..	Chain..	Ther..	Pressure...	Gear.....	Schebler..	Vacuum.	Dual...	Conn...	Hand..	Wagner....	6	Own.....	Cone..
Moline-Knight.....L	118	4	3 3/4 x 5	221	Own.....	K..	Chain..	Ther..	Pressure...	Gear.....	Schebler..	Vacuum.	Dual...	Conn...	Hand..	Wagner....	6	Borg & Beck.	Plate..
Monitor.....M & O	117	6	3 1/4 x 4 1/2	224	Continental..	L..	Helical.	Gear..	Splash-Pres.	Piston...	Stromberg..	Vacuum.	Single...		Hand..	Dyneto....	6	Borg & Beck.	Plate..
Moon.....6-36-19	114	6	2 1/2 x 4 1/2	175	Continental..	L..	Helical.	Ther..	Splash-Pres.	Piston...	Tillotson..	Gravity.	Single...	Delco...	Atmtc...	Wagner....	6	Detlaff....	Plate..
Moon.....6-66-19	125	6	2 1/2 x 5 1/4	303	Continental..	L..	Helical.	Cent..	Splash-Pr.	Piston...	Rayfield...	Vacuum.	Single...	Delco...	Atmtc...	Wagner....	6	Borg & Beck.	Plate..
Moore.....30-C	106	4	3 3/4 x 4 1/4	188	G.B. & S....		Chain..	Ther..	Splash-Pres.	Piston...	K-D.....	Gravity.	Single...	Conn...	Hand..	Auto-Lite...	6		Plate..
Nash.....681, 2, 3, 4, 5	121-127	6	3 1/2 x 5	249	Own.....	I..	Helical.	Cent..	Circ-Spl...	Gear.....	Marvel....	Vacuum.	Single...	Delco...	H & A...	Delco.....	6	Borg & Beck.	Plate..
National.....AF3	128	6	3 1/2 x 5 1/4	303	Continental..	L..	Helical.	Cent..	Splash-Pres.	Piston...	Rayfield...	Vacuum.	Single...	Delco...	H & A...	Westinghouse	6	Own.....	Cone..
National.....AK	128	12	2 1/2 x 4 3/4	370	Own.....	L..	Helical.	Cent..	Pressure...	Gear.....	Rayfield...	Vacuum.	Single...	Delco...	H & A...	Bijur.....	6	Own.....	Cone..
Oakland.....34-B	112	6	2 1/2 x 4 3/4	177	Own.....	I..	Spur...	Cent..	Pressure...	Gear.....	Marvel....	Vacuum.	Single...		Hand..	Remy.....	6	Northway..	Cone..
Oldsmobile.....37A	112	6	2 1/2 x 4 3/4	177	Northway...	I..	Helical.	Cent..	Pressure...	Gear.....	Johnson...	Vacuum.	Single...	Remy...	Hand..	Remy.....	6	Northway..	Cone..
Oldsmobile.....45A	120	8	2 1/2 x 4 3/4	247	Own.....	T..	Helical.	Cent..	Pressure...	Gear.....	Ball.....	Vacuum.	Single...	Delco...	H & A...	Delco.....	6	Own.....	Cone..
Olympian.....45	112	4	3 1/4 x 4 1/2	149	Own.....	I..	Helical.	Ther..	Pressure...	Gear.....	Stromberg..	Vacuum.	Single...	Conn...	Hand..	Auto-Lite...	6	Borg & Beck.	Plate..
Overland.....90	106	4	3 3/8 x 5	179	Own.....	L..	Helical.	Ther..	Circ-Spl...	Piston...	Tillotson..	Vacuum.	Single...	Conn...	Hand..	Auto-Lite...	6	Own.....	Cone..
Owen Magnetic.....W-42		6	4 x 5 1/2	415	Own.....	I..	Spur...	Cent..	Pressure...	Gear.....	Zenith....	Vacuum.	Single...	Bosch...	Hand..	Own.....	24		
Packard.....3-25 3-35		12	3 x 5	424	Own.....	T..	Chain..	Cent..	Pressure...	Gear.....	Own.....	Pressure.	Single...	Delco...	H & A...	Bijur.....	6	Own.....	Disk..
Paige.....6-55	127	6	3 1/2 x 5 1/4	303	Continental..	L..	Helical.	Cent..	Splash-Pres.	Piston...	Rayfield...	Vacuum.	Single...	Remy...	Hand..	Remy.....	6	Borg & Beck.	Plate..
Paige.....6-40	117	6	3 1/2 x 5	230	Rutenber...	L..	Helical.	Cent..	Splash-Pres.	Piston...	Stromberg..	Gravity.	Single...	Remy...	Hand..	G & D.....	6	Borg & Beck.	Plate..
Paterson.....6-48	120	6	3 1/4 x 4 1/2	224	Continental..	L..	Helical.	Cent..	Splash-Pres.	Piston...	Stromberg..	Vacuum.	Dual...	Delco...	Hand..	Delco.....	6	Borg & Beck.	Disk..
Peerless.....56	125	8	3 1/4 x 5	332	Own.....	T..	Helical.	Cent..	Pressure...	Gear.....	Ball.....	Vacuum.	Single...	At Kent.	H & A...	Auto-Lite...	6	Brown-Lipe.	Disk..
Pierce-Arrow.....48B-5	142	6	4 1/2 x 5 1/2	525	Own.....	DV.	Helical.	Cent..	Pressure...	Gear.....	Own.....	Pressure.	Double..	Bosch...	Hand..	Westinghouse	6	Own.....	Cont..
Pilot.....6-45	120	6	3 1/2 x 5	230	Teetor-Hart..	L..	Helical.	Cent..	Splash-Pres.	Piston...	Tillotson..	Vacuum.	Dual...	Delco...	Hand..	Delco.....	6	Borg & Beck.	Plate..
Premier.....6-C	125 1/2	6	3 3/8 x 5 1/2	295	Own.....	I..	Helical.	Cent..	Splash-Pres.	Gear.....	Johnson...	Vacuum.	Single...	Delco...	Hand..	Delco.....	6	Borg & Beck.	Plate..
Reo.....T & U	120	4	4 1/2 x 4 1/2	241	Own.....	F..	Helical.	Cent..	Circ-Spl...	Piston...	Johnson...	Vacuum.	Single...	Remy...	Hand..	Remy.....	6	Own.....	Disk..
Revere.....131		4	4 3/8 x 6	361	Duesenberg..	F..	Helical.	Cent..	Splash-Pres.	Gear.....	Stromberg..	Vacuum.	Single...	Bosch...	Hand..	North East..	6	Brown-Lipe.	Plate..
Roamer.....6-54	128	6	3 1/2 x 5 1/4	303	Continental..	L..	Helical.	Cent..	Splash-Pres.	Piston...	Stromberg..	Vacuum.	Single...	Bosch...	Hand..	Bijur.....	6	Borg & Beck.	Plate..
Saxon.....Y-18	112	6	2 1/2 x 4 1/2	175	Continental..	L..	Helical.	Ther..	Circ-Spl...	Piston...	Stromberg..	Vacuum.	Single...	Remy...	Hand..	Wagner....	6	Own.....	Plate..
Scripps-Booth.....6-39	112	6	2 1/2 x 4 3/4	177	Northway...	I..	Helical.	Cent..	Pressure...	Gear.....	Marvel....	Vacuum.	Single...	Remy...	Hand..	Remy.....	6	Northway..	Cone..
Seneca.....H	108	4	3 1/2 x 4 1/2	173	LeRoi.....	L..	Helical.	Ther..	Circ-Spl...		Schebler..	Vacuum.	Single...		Hand..		6	Detroit....	Plate..
Singer.....19	139	6	4 x 5 1/2	415	Hersh-Sp...	T..	Helical.	Cent..	Pressure...	Gear.....	Rayfield...	Vacuum.	Single...	Bosch...	Hand..	Westinghouse	6	Muncie....	Disk..
Standard.....G	127	8	3 1/4 x 5	332	Hersh-Sp...	L..	Helical.	Cent..	Pressure...	Gear.....	Zenith....	Vacuum.	Single...	Split...	Hand..	Westinghouse	6	Borg & Beck.	Plate..
Stearns.....SKL4	119	4	3 3/8 x 5	221	Own.....	K..	Chain..	Cent..	Splash-Pres.	Gear.....	Schebler..	Vacuum.	Single...	Remy...	Hand..	Remy.....	12	Own.....	Disk..
Stephens.....74-76	118	6	3 1/4 x 4 1/2	224	Own.....	I..	Helical.	Ther..	Pressure...	Gear.....	Stromberg..	Vacuum.	Single...	Delco...	Hand..	Delco.....	6	Borg & Beck.	Plate..
Studebaker.....EG	126	6	3 1/2 x 5	354	Own.....	L..	Helical.	Cent..	Circ-Spl...	Gear.....	Ball.....	Vacuum.	Single...	Remy...	Hand..	Wagner....	6	Own.....	Cone..
Studebaker.....EH	119	6	3 1/2 x 5	289	Own.....	L..	Helical.	Cent..	Circ-Spl...	Gear.....	Ball.....	Vacuum.	Single...	Remy...	Hand..	Wagner....	6	Own.....	Cone..

ABBREVIATIONS

2-pt—Two Point
 3/4 Ell—3/4 Elliptic
 3/4 Float—3/4 Floating
 3/4 Plat—3/4 Platform
 Amid—Amidships
 Atmtc—Automatic
 B & P—Ball and Plain

B & R—Ball and Roller
 B R & P—Ball, Roller and Plain
 C & C—Cup and Cone
 Cant—Cantilever
 Cent—Centrifugal
 Circ-Spl—Circulating Splash
 Dual-D—Dual Double
 D V—Dual Valve

Ell—Elliptic
 F—1 Valve in Head, 1 in Side
 Float—Floating
 Fric—Friction
 Gear—Gear Pump
 H—Horizontal
 H & A—Hand and Automatic
 I—I-Head

Imp—Impeller
 K—Knight Type
 L—L-Head
 Mag—Magnetic
 Non-Spl—Non-Circulating Splash
 Opt—Optional
 Plan—Planetary
 Plat—Platform

Their Technical Specifications—Continued

TRANSMISSION						Gear Ratio on Direct	RUNNING GEAR				Make of Steering Gear	Make of Speedometer	Crank-shaft Bearings and Number	BEARINGS			MAKE AND MODEL		
GEARSET			Final Drive	Torque Taken By	Make of Rear Axle		Rear Axle Type	TIRES		Wheels				Rear Springs	Gearset	Rear Axle		Front Wheel	
Make	Location	Forward Speeds						Front	Rear										
Grant-Lees	Unit M.	3	Sp.B.	Springs	Hess	¾-Float.	4.50	33x4	33x4	Wood	¾-Ell.	Wohlrab	Stewart	Plain 3	Ball	Ball	Roller	Kline	6-42-H
Warner	Unit M.	3	Sp.B.	Springs	Hess	Float	5.00	34x4	34x4	Wood	S-E	T.W.Warner	Stewart	Plain 3	Ball	Roller	Ball	Lexington	R-19
Detroit	Unit M.	3	Sp.B.	Springs	Timken	Semi-F.	4.75	32x4	32x4	Wood	S-E	Jacox	Stewart	Plain 3	B&P	Roller	Roller	Liberty	10-B
Own	Amid	4	Sp.B.	Rad-Rod	Own	Float	4.07	35x5	35x5	Wood	¾-Ell.	Own	Stewart	Plain 7	Ball	Ball	Roller	Locomobile	38-2
Own	Amid	4	Sp.B.	Rad-Rod	Own	Float		35x5	35x5	Wood	¾-Ell.	Own	Stewart	Plain 7	Ball	Ball	Roller	Locomobile	11-48
Mechanics	Unit M.	3	Bevel	Springs	Peru	Float	4.50	32x3½	32x3½	Wood	S-E	Jacox	Stewart	Plain 3	Ball	B&R	Ball	Maibohm	B
Own	Unit-T.	3	Sp.B.	Tor-A	Own	¾-Float.	3.69-4.00	32x4½	32x4½	Wire	Trans.	Gemmer	Van Sicklen	Plain 4	BR&P	B&R	Roller	Marmon	34
Own	Unit M.	3	Bevel	Springs	Own	¾-Float.	3.58	30x3½	30x3	Wood	S-E	Own	Stewart	Plain 2	R&P	B&R	Ball	Maxwell	25
Brown-Lipe	Amid	3	Sp.B.	Springs	Timken	Float	3.50	35x5	35x5	Wood	S-E	Gemmer	Stewart	Plain 4	Roller	Roller	Roller	McFarlan	
Own	Amid	4	Sp.B.	Springs	Own	Float	3.62	32x4½	32x4½	Opt.	S-E	Gemmer		Plain 3	Ball	B&R	Roller	Mercer	4
Own	Amid	3	Sp.B.	Springs	Own	Float	4.41	34x4	34x4	Wood	Cant.	Own		Plain 3	B&R	Roller	Roller	Mitchell	C-42
Own	Amid	3	Sp.B.	Springs	Own	Float	4.41	32x4	32x4	Wood	Cant.	Own		Plain 3	B&R	Roller	Roller	Mitchell	D-40
Warner	Amid	3	Sp.B.	Tor-A	Timken	¾-Float.	4.12	35x4½	35x4½	Wood	Trans.	Jacox		Plain 3	Roller	Roller	Roller	Moline-Knight	G
Warner	Amid	3	Sp.B.	Tor-A	Timken	Semi-F.	4.96	34x4	34x4	Wood	Trans.	Jacox		Plain 3	Roller	Roller	Roller	Moline-Knight	L
Grant-Lees	Unit M.	3	Sp.B.	Springs	Adams	Float	4.00	33x4	33x4	Wood	¾-Ell.	C.A.S.	Stewart	Plain 3	Ball	B&R	Ball	Monitor	M & O
Own	Unit M.	3	Sp.B.	Springs	Own	Float	4.75	32x3½	32x3½	Wood	S-E	Warner			Ball	Roller	Roller	Moon	6-36-19
Warner	Unit M.	3	Sp.B.	Springs	Timken	¾-Float.	4.60	35x4½	35x4½	Wood	S-E	Warner		Plain 3	Ball	Roller	Roller	Moon	6-66-19
Grant-Lees	Unit M.	3	Bevel	Springs	Peru	Float	4.25	30x3½	30x3½	Wood	¾-Ell.			Plain 3	Ball	B&R	Ball	Moore	30-C
Own	Unit M.	3	Sp.B.	Springs	Own	Semi-F.	4.50	33x4	33x4	Wood	S-E	Jacox	Stewart	Plain 3	Roller	Roller	Roller	Nash	681 2 3 4 5
Muncie	Unit M.	3	Sp.B.	Springs	Columbia	Float	4.58	34x4½	34x4½	Wood	Cant.	T.W.Warner	Stewart	Plain 3	Ball	Roller	Roller	National	AF3
Muncie	Unit M.	3	Sp.B.	Springs	Columbia	Float	4.58	34x4½	34x4½	Wood	Cant.	T.W.Warner	Stewart	Plain 3	Ball	Roller	Roller	National	AK
T.W.Warner	Unit M.	3	Bevel	Springs	West-M.	¾-Float.	4.50	32x4	32x4	Wood	S-E	Jacox	Stewart	Plain 3	Ball	B&R	Ball	Oakland	34-B
Warner	Unit M.	3	Sp.B.	Springs	West-M.	Float	4.58	32x4	32x4	Wood	S-E	Northway	Stewart	Plain 3	B&P	B&R	Roller	Oldsmobile	37A
Northway	Unit M.	3	Sp.B.	Springs	West-M.	Float	4.61-4.91	34x4	34x4	Wood	¾-Ell.	Jacox	Stewart	Plain 2	B&P	B&R	Roller	Oldsmobile	45A
Own	Unit M.	3	Sp.B.	Tor-A	Peru	Float	4.64	32x3½	32x3½	Opt.	Trans.	T.W.Warner	Stewart	Plain 2	B&P	B&R	Ball	Olympian	45
Own	Unit-X.	3	Sp.B.	Tor-T.	Own	¾-Float.	3.93	31x4	31x4	Wood	Cant.	Own	Stewart	Plain 2	BR&P	Ball	Roller	Overland	90
Own			Sp.B.	Springs	American	Float	4.00	35x5	35x5	Opt.	S-E	Own		Plain 3	Ball	Roller	Roller	Owen Magnetic	W-42
Own	Unit M.	3	Sp.B.	Springs	Own	Semi-F.	4.36	35x5	35x5	Wood	S-E	Own	Waltham	Plain 3	Ball	Ball	Roller	Packard	3-25 3-35
Own	Unit M.	3	Sp.B.	Tor-T.	Salisbury	¾-Float.	4.36	35x4½	35x4½	Wood	Cant.	Jacox		Plain 3	BR&P	B&R	Ball	Paige	6-55
Own	Unit M.	3	Sp.B.	Tor-T.	Salisbury	¾-Float.	4.42	33x4	33x4	Wood	Cant.	Jacox		Plain 3	BR&P	B&R	Roller	Paige	6-40
Durston	Unit M.	3	Sp.B.	Springs	Hess	Float	4.50	33x4	33x4	Wood	S-E	Jacox		Plain 3	Ball	Roller	Roller	Paterson	6-48
Brown-Lipe	Unit M.	3	Sp.B.	Springs	Timken	Semi-F.	4.90	34x4½	34x4½	Wood	Plat	Gemmer	Stewart	Plain 3	Roller	Roller	Roller	Peerless	56
Own	Amid	4	Sp.B.	Springs	Own	Semi-F.		35x5	35x5	Wood	¾-Ell.	Own	Stewart	Plain 7	Ball		Roller	Pierce-Arrow	48B-5
Muncie	Unit M.	3	Sp.B.	Tor-T.	Hess	Float	4.25	32x4	32x4	Wood	Cant.	C.A.S.	Van Sicklen	Plain 3	Ball	B&R	Roller	Pilot	6-45
Detroit	Unit M.	3	Sp.B.	Springs	Timken	Semi-F.	4.45	32x4½	32x4½	Wood	S-E	Warner	Stewart	Plain 3	Ball	Roller	Roller	Premier	6-C
Own	Amid	3	Sp.B.	Springs	Own	Semi-F.	4.30-4.60	34x4	34x4	Wood	S-E	Own	Stewart	Plain 3	Roller	Roller	Roller	Reo	T & U
Brown-Lipe	Unit M.	4	Sp.B.	Tor-A	American	Float	3.50	32x4½	32x4½	Wire	S-E	Gemmer	Stewart	Plain 2	Ball	Roller	Roller	Revere	
Grant-Lees	Unit M.	3	Sp.B.	Springs	Hess		3.77	32x4	32x4	Wire	S-E	Jacox	Stewart	Plain 3	Ball	Ball	Ball	Roamer	6-54
Own	Unit X.	3	Sp.B.	Tor-A	Own	Semi-F.	5.00	32x3½	32x3½	Wood	Cant.	Warner	Stewart	Plain 3	Roller	Roller	Roller	Saxon	Y-18
T.W.Warner	Unit M.	3	Bevel	Springs	West-M.	¾-Float.	4.50	32x4	32x4	Opt.	S-E	Jacox	Stewart	Plain 3	B&P	B&R	Ball	Scripps-Booth	6-39
Detroit	Unit M.	3	Sp.B.	Springs	Adams	Float	4.50	30x3½	30x3½	Wood	Cant.	Ditweiler	Stewart	Plain	Ball	Ball	Roller	Seneca	H
Muncie	Unit M.	4	Sp.B.	Tor-A	Timken	Float	3.70	35x5	35x5	Wire	Cant.	Gemmer	Stewart	Plain 3	Ball	Roller	Roller	Singer	19
Grant-Lees	Unit M.	3	Sp.B.	Springs	Timken	Semi-F.	4.90-4.45	34x4½	34x4½	Wood	S-E	Gemmer	Stewart	Plain 3	B&R	Roller	Roller	Standard	G
Own	Unit M.	3	Sp.B.	Springs	Own	Semi-F.	4.50	34x4½	34x4½	Wood	Cant.	Own	Stewart	Plain 3	B&R	B&R	Roller	Stearns	SK14
Mechanics	Unit M.	3	Sp.B.	Springs	Opt.	Float	4.75	32x4	32x4	Opt.	S-E	Gemmer	Van Sicklen	Plain 3	Ball	B&R	Roller	Stephens	74-76
Own	Amid	3	Sp.B.	Springs	Own	Semi-F.	3.70	33x4½	33x4½	Wood	S-E	Gemmer		Plain 4	R&P	Roller	Roller	Studebaker	EG
Own		3	Sp.B.	Springs	Own	Semi-F.	4.00	32x4	32x4	Wood	S-E	Gemmer		Plain 4	R&P	Roller	Roller	Studebaker	EH

Rad-Rd—Radius Rods
 Rev-C—Reversed Cone
 Roll—Roller
 S-A—Semi-Automatic
 S-E—Semi-Elliptic
 Semi-F—Semi-Floating
 Sp.B—Spiral Bevel
 Sp.G—Spiral Gear
 Splash-Pre—Splash Pressure

Spur—Spur Gears
 T—T-Head
 Ther—Thermo-Syphon
 Tor-A—Torsion Arm
 Tor-R—Torsion Rod
 Tor-T—Torsion Tube
 Tr S-E—Transverse Semi-Elliptic
 Trans—Transverse
 Unit-M—Unit with Motor

Unit-T—Unit with Torque Tube
 Unit-X—Unit with Axle
 Vib-Dup—Vibrating Duplex
 †—Wire Extra
 *Also available—3.77:1, 4.08:1 and 4.45:1

EQUIPMENT

At Kent—Atwater Kent
 G.B.&S.—Golden, Belknap & Swartz

G. & D.—Gray & Davis
 Hersh-Sp—Herschell-Spillman
 Johns-Man—Johns-Manville
 Leece-N—Leece-Neville
 Mass-Ph—Massnick-Phipps
 Teet-Hart—Teetor-Hartley
 W-Weiss—Walker-Weiss
 Ward-L—Ward Leonard
 West-M—Weston-Mott

1919 Passenger Automobiles Listed with

MAKE AND MODEL	Wheel-base	No. of Cylinders	Bore and Stroke Inches	Piston Displacement Cubic Inches	Make of Engine	Cylinder Shape	Cam-shaft Drive	Water Circulation	LUBRICATION		CARBURETION		IGNITION			ELECTRIC SYS.		CLUTCH	
									System	Type of Pump	Make of Carburetor	Fuel Feed	System	Make	Control	Generator Make	Voltage	Make	Type
Studebaker.....LH	112	4	3½x5	192	Own.....	L....	Helical	Cent.	Circ-Spl....	Gear.....	Schebler....	Vacuum	Single....	Remy....	Hand....	Wagner.....	6	Own.....	Cone..
Stutz.....G	120-130	4	4½x6	215	Own.....	DV..	Helical	Cent.	Splash-Pres.	Gear.....	Stromberg..	Pressure.	Double....	.....	Hand....	Remy.....	12	Own.....	Cone..
Templar.....445	118	4	3½x5½	197	Own.....	I....	Chain...	Cent.	Pressure....	Gear.....	Zenith.....	Vacuum	Single....	Remy....	H & A..	Remy.....	6	Borg & Beck	Plate..
Tulsa.....D	117½	4	3½x5	192	Lycoming..	L....	Helical	Ther.	Circ-Spl....	Piston....	Zenith.....	Vacuum	Single....	Delco....	Hand....	Dyneto.....	6	Borg & Beck	Plate..
Velie.....38	114½	6	3¼x4½	274	Continental..	L....	Helical	Cent.	Splash-Pres.	Piston....	Rayfield....	Vacuum	Single....	Remy....	Atmtc....	Remy.....	6	Borg & Beck	Plate..
Velie.....39	124	6	3½x5½	303	Continental..	L....	Helical	Cent.	Splash-Pres.	Piston....	Rayfield....	Vacuum	Single....	Remy....	Atmtc....	Remy.....	6	Borg & Beck	Plate..
Westcott.....18-A	125	6	3½x5½	303	Continental..	L....	Helical	Cent.	Circ-Spl....	Piston....	Rayfield....	Vacuum	Single....	Delco....	H & A..	Delco.....	6	Brown-Lipe..	Disk..
Willys-Knight.....68-4	121	4	4½x4½	241	Own.....	K....	Chain...	Ther.	Splash-Pres.	Piston....	Tillotson...	Vacuum	Single....	Conn....	Hand....	Auto-Lite..	6	Own.....	Cone..
Winton.....22	138	6	4½x5½	501	Own.....	L....	Chain...	Cent.	Pressure....	Piston....	Rayfield....	Vacuum	Single....	Bosch....	Hand....	Bijur.....	6	.....	Disk..
Winton.....22-A	128	6	3½x5½	348	Own.....	L....	Chain...	Cent.	Pressure....	Piston....	Rayfield....	Vacuum	Single....	Bosch....	Hand....	Bijur.....	6	.....	Disk..

ABBREVIATIONS

2-pt—Two Point
 ¾ Ell—¾ Elliptic
 ¾ Float—¾ Floating
 ¾ Plat—¾ Platform
 Amid—Amidships
 Atmtc—Automatic
 B & P—Ball and Plain

B & R—Ball and Roller
 B R & P—Ball, Roller and Plain
 C & C—Cup and Cone
 Cant—Cantilever
 Cent—Centrifugal
 Circ-Spl—Circulating Splash
 Dual-D—Dual Double
 D V—Dual Valve

Ell—Elliptic
 F—1 Valve in Head, 1 in Side
 Float—Floating
 Fric—Friction
 Gear—Gear Pump
 H—Horizontal
 H & A—Hand and Automatic
 I—I-Head

Imp—Impeller
 K—Knight Type
 L—L-Head
 Mag—Magnetic
 Non-Spl—Non-Circulating Splash
 Opt—Optional
 Plan—Planetary
 Plat—Platform

What Return to Peacetime Conditions May Mean to Car Design

WARTIME conditions which turned the flow of materials from commercial to war purposes have been reflected in the make-up of the 1918 cars and of the 1919 cars. It is to be expected that in certain points cars of a vintage later in the coming season, and more particularly those which are now undergoing design for production in 1920, will have incorporated in them to a greater extent some of the materials which war prices have placed beyond a point of economical production.

Thus it is to be anticipated that aluminum cylinders may be a feature of engine design of the 1920 cars to a far greater extent than they have been in the last two years. The stopping of progress in this direction came about not through mechanical defects of the material or its method of handling but through the multiplication of its cost during the war period.

Another way in which removal of war conditions may be expected to change the materials of later car construction is in the return of brass and other copper alloys and displacing at certain points the steel stampings which have supplanted them. Inherent qualities of the copper alloys such as freedom from rust and so on make them preferable at many points to steel.

The return to peacetime conditions may also mean the return of leather and other upholstering materials which have been boosted in price beyond the reach of the more moderate-priced car buyer, even though the condition which made leather a luxury has brought about the popularization of excellent substitutes for leather which answer the purpose in almost every respect.

During the war facilities for the production of aluminum castings and aluminum

sheet, as well as for brass and bronze castings have increased so tremendously that there is every reason to anticipate a commensurate reduction in price. Similarly we may expect better grades of steel and new methods of handling steel to be incorporated in the new cars, because the factories that have been producing aviation engines in quantities have learned to work with delicate steel alloys and now are not afraid to attempt handling them in motor car production.

Trend of Car Body Designs

(Concluded from page 25)

all cars will run with a very good degree of satisfaction. The individual, however, wants to have some individuality, and this can be shown in the lines of the body, fenders, etc.

There is a tendency of a few of the agencies in different cities to get together and order from body manufacturers quantities of bodies made alike, one or two bodies for each city which they represent. In the strict sense, these are not custom bodies but *special* bodies and should be labeled bodies built for such and such an agency by such a body manufacturer. The true *custom* body, built for the individual, should bear only the name of the carrossier. The general tendency of designs in custom bodies has been toward collapsible landaulets, folding landaulets, touring sedans, touring limousines, etc. The custom bodies as a rule are narrower, made only for two on the rear seat, and the head room—from floor to ceiling—inside has been

reduced from 58 to 60 in. in the old designs, to 48 to 56 in. in the new designs.

The town and country brougham has come to be recognized among the highest-class trade. I may add that the town brougham is distinguished from the country brougham in that the front or chauffeur's seat is separated from the body proper in the town brougham, making an individual front seat. Also, the town brougham usually has three fenders on a side. The leather fender for the town brougham has been replaced almost entirely by metal fenders of similar design.

The trimming in custom-made jobs very often is plain without buttons or pleats. This is probably one of the distinguishing features between a custom and factory body, since plain trim has to be done in the body proper rather than to be made up on a bench and tacked in later. Also, the under part of the trimming must be done with a great deal more care. Custom-made touring cars very often incorporate a center windshield, that is, a windshield back of the chauffeur, as well as the one in front of the chauffeur.

Future of the Industry

Let us for a moment look forward to the possibilities for the coming year or so. The sedan and coupe certainly are going to come into more prominence and popularity every year, not only by the city user but also the farmer. The farmer will have a motor truck to do what the touring car is doing to-day, carry products to or from town. When he gets his truck and when the roads become roads that can be used 365 days in the year, then he will want a sedan or coupe for family use. There undoubtedly will be some changes in con-

Their Technical Specifications—Continued

TRANSMISSION							Gear Ratio on Direct	RUNNING GEAR				Make of Steering Gear	Make of Speedometer	Crankshaft Bearings and Number	BEARINGS			MAKE AND MODEL	
GEARSET			Final Drive	Torque Taken By	Make of Rear Axle	Rear Axle Type		TIRES		Wheels	Rear Springs				Gearset	Rear Axle	Front Wheel		
Make	Location	Forward Speeds						Front	Rear										
Own.....		3	Sp.B.	Springs...	Own.....		4.08	32x3½	32x3½	Wood...	S-E.....	Gemmer.....	Plain 3...	R&P...	Roller...	Roller...	Studebaker.....	LH	
Own.....	Unit X	3	Sp.B.	Rad-Rod.	Own.....	¾-Float.		32x4½	32x4½	Wire...	S-E.....	Gemmer.....	Stewart...	Plain 3...	Ball...	B&R...	Roller...	Stutz.....	G
Own.....	Unit M.	3	Sp.B.	Springs...	American.	Semi-F.	4.40	32x4	32x4	Wood...	S-E.....	Jacox.....	Stewart...	Plain 3...	B&P...	B&R...	Roller...	Templar.....	445
Grant-Lees.	Unit M.	3	Sp.B.	Springs...	Salisbury.	Float...	4.50	33x4	33x4	Opt....	S-E.....	C.A.S.....	Stewart...	Plain 2...	B&P...	BR&P.	Ball...	Tulsa.....	D
Darston....	Unit M.	3	Sp.B.	Springs...	Timken.	Float...	4.75	32x4	32x4	Wood...	¾-Ell...	Gemmer.....	Van Sicklen.	Plain 3...	B&P...	Roller...	Roller...	Velie.....	38
Warner.....	Unit M.	4	Sp.B.	Springs...	Timken.	Float...	4.45-4.08	33x4½	33x4½	Wood...	¾-Ell...	Gemmer.....	Van Sicklen.	Plain 3...	Ball...	Roller...	Roller...	Velie.....	39
Opt.....	Unit M.	3	Sp.B.	Springs...	Timken.	¾-Float.	4.45	32x4½	32x4½	Wood...	Cant....	Gemmer.....	Stewart...	Plain 3...	Roller...	Roller...	Roller...	Westcott.....	18-A
Own.....	Unit-X.	3	Sp.B.	Tor-T...	Own.....	Float...	4.30	34x4½	34x4½	Wood...	Cant....	Own.....	Stewart...	Plain 3...	BR&P.	Roller...	Roller...	Willys-Knight.....	88-4
.....	Unit M.	4	Sp.B.	Springs...	.....	Float...	4.08	35x5	35x5	Wood...	¾-Ell...	.....	Stewart...	Plain 4...	B&R...	Roller...	Roller...	Winton.....	22
.....	Unit M.	4	Sp.B.	Springs...	.....	Float...	4.73	35x5	35x5	Wood...	¾-Ell...	.....	Stewart...	Plain 4...	B&R...	Roller...	Roller...	Winton.....	22-A

Rad-Rd—Radius Rods
Rev-C—Reversed Cone
Roll—Roller
S-A—Semi-Automatic
S-E—Semi-Elliptic
Semi-F—Semi-Floating
Sp.B—Spiral Bevel
Sp.G—Spiral Gear
Splash-Press—Splash Pressure

Spur—Spur Gears
T—T-Head
Ther—Thermo-Syphon
Tor-A—Torsion Arm
Tor-R—Torsion Rod
Tor-T—Torsion Tube
Tr S-E—Transverse Semi-Elliptic
Trans—Transverse
Unit-M—Unit with Motor

Unit-T—Unit with Torque Tube
Unit-X—Unit with Axle
Vib-Dup—Vibrating Duplex
†—Wire Extra
*Also available—3.77:1, 4.08:1 and 4.45:1

EQUIPMENT

At Kent—Atwater Kent
G.B.&S.—Golden, Belknap & Swarts

G. & D—Gray & Davis
Hersh-Sp—Herschell-Spillman
Johns-Man—Johns-Manville
Leece-N—Leece-Neville
Mass-Ph—Massnick-Phipps
Teet-Hart—Teetor-Hartley
W-Weiss—Walker-Weiss
Ward-L—Ward-Leonard
West-M—Weston-Mott

Opportunities Offered by Europe and Effect of Gas Situation

struction of the coupe or sedan as manufactured at present, but that construction will make for a much lighter roof and overhead weight, and probably the touring type of sedan with its folding pillars will decline in popularity because of its tendency to leak and rattle.

Europe Favors Six-Cylinder Cars

SO far as can be judged from the descriptions of the new cars which are being developed by European designers, particularly those cars which are to be labeled post-war designs, it is to be believed that Europe is going heavily to the six-cylinder. Heretofore, the English, French and Italian public has leaned toward the four-cylindered car of high thermal efficiency installed in a chassis of excellent workmanship and carrying the body consonant with the high price at which it is marketed. The high-grade four probably will remain the predominant type abroad for some time, but there are so many new sixes undergoing design and construction that the success in Europe of the American medium-priced six imported during 1915 and 1916 is leading to a tryout of the small six built to European standards.

This condition is in the face of the present high price of motor fuel abroad and the rather set opinion on the part of the European buying public that the small car of four cylinders is preferable from the fuel economy standpoint. In spite of the price of fuel in Europe and in spite of the fact that there is no immediate prospect of an improvement in the grade of fuel, it does not seem that European engineers are

taking any special precaution to take care of this heavy fuel. It is exceptionally unlikely that they will be supplied with a pre-war grade of gasoline and it is probable that if the foreign cars are to equal American products in their handling of present-day gasoline they will have to adopt some of the methods of pre-heating that are being employed in the newer designs on this side of the water.

Still the Fuel Gets Worse

YEARS ago when the Baumé hydrometer registered near 70 deg. for average gasoline, the combustion within the cylinder was more of an explosion, but now when the hydrometer registers near 50 deg. the combustion is more of a continuous burning of the fractional distillates, as the temperature within the cylinder rises to the igniting temperatures of these distillates. In one test, conducted by the writer, the gasoline registered 38 deg. Baumé and refused to burn when a match was thrown into it. This has resulted in larger cooling spaces for the water.

Dashboard adjustment of the carburetor is another feature that is being installed this year and is a very desirable feature, necessitated by the fuel conditions. When starting in cold weather, it is necessary to draw into the cylinder a quantity of fuel sufficient to produce enough of the volatile distillates to start the engine. These volatile parts soon bury away, leaving behind the heavier hydrocarbon, which will not ignite and burn while the engine is still cold, so these heavier parts of the fuel run

down into the crankcase and destroy the lubricating properties of the oil.

This has resulted in the adoption of a new piston ring by one manufacturer, one that will provide for expansion in two directions, diametrically with the bore and longitudinally with the stroke. Rapid flame propagation within the cylinder is dependent a great deal on the start that is given by the spark, and the condition of the spark is dependent upon the temperature of the spark-plug electrodes, so new designs by the spark plug makers provide for hot electrodes.

French Plants Can Hold Own

FRANCE really has little to fear from an invasion of her territory. If the old tariff goes into force again some of the cheapest makes of American cars can be sold on a price basis. In the medium car class local competition will be so keen that it is doubtful if American firms will be interested in the market. The highest class of American cars never have threatened France. Trucks can be produced very much quicker than touring cars, so there will be no gap during which the American maker will have the market to himself. Further, the military subsidy scheme puts all foreign truck makers at a disadvantage. What France needs much more than protection for her own shores is protection for her export trade—a thing not easy to obtain. French factories cannot possibly make deliveries in any quantities before the middle of 1919, and there is a fear that American will have got a good hold of the foreign markets in the meantime.

Motor Age Monthly Farm-Lighting Specification Tables

Name and Model	Maker	Watts capacity	No. 20 watt lamps	Lamp voltages	No. cyl's	No. cycles	Make of engine	Horsepower	Fuel	Cooling	Power pulley	Generator drive	Make of generator	Make of battery	Battery amp. hours	Battery volts	No. cells	Starting engine	Stopping engine	Governor type	Price
Acorn.....	Acorn Electric Mfg. Co., Minneapolis	1000	15-25	40	1	2	Newway	3	Water	Water	Opt.	Belt	GE Alco	Willard	60	28-42	16	Auto.	Auto.	Throttle	\$ 375
Aerothrust.....	Aerothrust Engine Co., La Porte, Ind.	750	40-120	10	1	4	Idle	1 1/4	Water	Water	Opt.	Direct	GE Alco	Willard	70	6	3	Auto.	Auto.	Electro-mag.	450
Alamo.....	Alamo Farm Light Co., Omaha, Neb.	850	55-75	32	2	4	Alco	2	Water	Water	Opt.	Direct	Imperial	Willard	80	32	16	Auto.	Auto.	Throttle	450
Automatic Light Co., Minneapolis, Minn.		1000	20-70	32	2	4	Own	2	Water	Water	Opt.	Belt	Imperial	Willard	120	32	16	Auto.	Auto.	Throttle	450
Cushman, A.....	Cushman Motor Works, Lincoln, Neb.	1000	20-70	32	2	4	Own	2	Water	Water	Opt.	Belt	Imperial	Willard	120	32	16	Auto.	Auto.	Throttle	450
Delco, 3 KW, 32 volt.	Domestic Engineering Co., Dayton, Ohio	1000	20-70	32	2	4	Own	2	Water	Water	Opt.	Belt	Imperial	Willard	120	32	16	Auto.	Auto.	Throttle	450
Domestic Engineering Co., Dayton, Ohio		1000	20-70	32	2	4	Own	2	Water	Water	Opt.	Belt	Imperial	Willard	120	32	16	Auto.	Auto.	Throttle	450
Dyneto, 5, 3 KW, 110-volt.	Dyneto Electric Co., Syracuse, N. Y.	3000	150	110	1	2	Own	6	Water	Water	Opt.	Belt	Own	Edison	200	32	16	Auto.	Auto.	Throttle	450
Fairbanks-Morse, F-3 hp.	Fairbanks, Morse & Co., Chicago	600	16-42	32	1	2	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	80	32	16	Auto.	Auto.	Throttle	385
Fairbanks-Morse, F-6 hp.	Fairbanks, Morse & Co., Chicago	900	22-65	32	1	2	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	460
Fairmont, B-4.....	Fairmont Gas E. & R. M. Co., Fairmont, Minn.	600	16-42	32	1	2	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	80	32	16	Auto.	Auto.	Throttle	320
Garford.....	Garford Mfg. Co., Elyria, Ohio	500	6-43	30	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Genco, A.....	General Gas-Electric Co., Hanover, Pa.	600	10-59	30	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Jones, A.....	L. B. Jones Co., Kansas City, Mo.	750	40	32	1	2	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Lauson-Edison, 201, 203-30.	Lauson Electric Light Co., Detroit	1000	7-30	50	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Lauson Junior, 300, 206-110.	Lauson Electric Light Co., New Holstein, Wis.	1000	16-50	50	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Langstadt-Meyer, 6, 6 1/2, 7.	Langstadt-Meyer Co., Appleton, Wis.	1200	27-154	125	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Main, 25-30 volt.	Main Electric Mfg. Co., Pittsburgh, Pa.	600	25-41	30	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Marcon, 40, 50, 60, 75, 100.	Marcon Electric Mfg. Co., Chicago	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Mathews, A-1, B-1, C.	Mathews Engineering Co., Sandusky, Ohio	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Mayhew, K 1, K 2, K 3.	Mayhew Co., Milwaukee, Wis.	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Mor-Lite.....	Fairbanks, Morse & Co., Chicago	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Perfection, FA 1, FA 6.	R. M. Owen & Co., New York	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Powerlite, 163 L-65, 163 L-67, 163 L-69.	Perfection Storage Battery Co., Chicago	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Rohaco, Unit A-1, BE-1, BE-2, BE-3.	Robertson-Hamilton Co., Minneapolis, Minn.	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Swanite.....	Black Swan Co., Waseca, Minn.	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Swartz-Unit E, F.	Swartz Electric Co., Indianapolis, Ind.	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Unit-Letric, 15-DC-90, 15-DC-180.	Unit-Letric Corp., Detroit	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Winton, 15-light, 30-light, 50-light, 100-light.	Winton Eng. Works, Cleveland, Ohio	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475
Wisconsin, 15-light, 30-light, 50-light, 100-light.	Lauson-Lawton Co., De Pere, Wis.	1000	25-75	110	1	4	Own	1 1/2	Water	Water	Opt.	Belt	Own	Edison	110	32	16	Auto.	Auto.	Throttle	475

*Without engine. Opt., optional. S-Auto, semi-automatic. K, kerosene. G, gasoline. Electro-mag, electro-magnetic.

1919 Directory of the Truck Makers

219 Manufacturers of American Commercial Vehicles—
206 Gasoline, Four Steam and Nine Electric—
Number and Capacity of Models Made

Name	Manufacturer	Address	MODELS IN TONS CAPACITY												
			Figures refer to capacity, not number of models												
			Under 1	1	1½	2	2½	3	3½	4	5	5½	6	6½	7 and over
Gasoline Vehicles															
A & B	American & British Mfg. Co.	Providence, R. I.						3			5				
Acason	Acason Motor Truck Co.	Detroit, Mich.			1½	2			3½		5		6		T
Acme	Acme Motor Truck Co.	Cadillac, Mich.			1	2			3½		5				
Admiral	Admiral Motor Car Co.	St. Louis, Mich.													
Air-O-Flex	Air-O-Flex Auto Corp.	Detroit, Mich.				2									
All American	All American Truck Co.	Chicago, Ill.			1										
American	American Motor Truck Co.	Newark, Ohio				2			3½		5				
American	American Motor Vehicle Co.	La Fayette, Ind.													
Armleder	O. Armleder Co.	Cincinnati, Ohio				2			3½						
Atlas	Martin Truck & Body Corp.	York, Pa.			1										
Atterbury	Atterbury Motor Car Co.	Buffalo, N. Y.				1½	2		3½		5				
Autocar	Autocar Co.	Ardmore, Pa.				2									
Autohorse	One Wheel Truck Co.	St. Louis, Mo.									5				
Available	Available Truck Co.	Chicago, Ill.			1	2			3½		5				
Bauer	Bauer Machine Works	Kansas City, Mo.			1										
Beck	Beck-Hawkeye Truck Wks.	Cedar Rapids, Iowa			1	1½	2								
Beech Creek	Beech Creek Truck & Auto Co.	Beech Creek, Pa.						3							
Bell	Bell Motor Car Co.	York, Pa.			1	1½	2		3½						
Bessemer	Bessemer Motor Truck Co.	Grove City, Pa.			1	1½	2		3½						
Bethlehem	Bethlehem Motors Corp.	Allentown, Pa.				1½		2½	3½						
Bourne	Bourne Magnetic Truck Co.	New York City				2			3½						
Brinton	Brinton Motor Truck Co.	Philadelphia, Pa.			1		2½								
Briscoe	Briscoe Motor Corp.	Jackson, Mich.			1										
Brockway	Brockway Motor Truck Co.	Cortland, N. Y.			1	1½	2		3½		5				
Camden	Camden Motor Corp.	Camden, N. J.													
Chase	Chase Motor Truck Co.	Syracuse, N. Y.			1	1½	2½	3	3½						
Chevrolet	Chevrolet Motor Co.	Flint, Mich.			1										
Clydesdale	Clyde Cars Co.	Clyde, Ohio				2			3½		5				
Collier	Collier Motor Truck Co.	Bellevue, Ohio				1½									
Columbia	Columbia Motor Truck & Trailer Co.	Pontiac, Mich.				2							6		
Comet	Comet Automobile Co.	Decatur, Ill.			1										
Commerce	Commerce Motor Car Co.	Detroit, Mich.			1										
Concord	Abbott-Downing Truck & Body Co.	Concord, N. H.			1	1½	2½								
Conestoga	Conestoga Motor Truck Co.	Lancaster, Pa.													
Corbitt	Corbitt Motor Truck Co.	Henderson, N. C.			1	1½	2	2½	3½		5				
Corliss	Corliss Motor Truck Co.	Corliss, Wis.			1										
Couple-Gear	Couple-Gear Power Truck Co.	Chicago, Ill.							3½		5				
Croce	Croce Automobile Co.	Asbury Park, N. J.			1										
Dain	Dain Mfg. Co.	Ottumwa, Iowa			1										
Dart	Dart Truck & Tractor Corp.	Waterloo, Iowa			1		2		3½						
Dayton	Durable-Dayton Truck Co.	Dayton, Ohio				2			3½						7½
D-E	Day-Elder Motors Corp.	Newark, N. J.			1	1½	2	2½			5				
Defiance	Turnbull Motor Truck & Wagon Co.	Defiance, Ohio			1										
DeKalb	DeKalb Wagon Co.	DeKalb, Ill.				2	2½								
Denby	Denby Motor Truck Co.	Detroit, Mich.			1			3			5				
Diamond-T	Diamond-T Motor Car Co.	Chicago, Ill.			1	1½	2		3½		5				
Dispatch	Dispatch Motor Car Co.	Minneapolis, Minn.			1										
Doane	Doane Motor Truck Co.	San Francisco, Cal.											6		
Dodge Bros.	Dodge Bros.	Detroit, Mich.													
Dorris	Dorris Motor Car Co.	St. Louis, Mo.				2									
Douglas	Douglas Motors Corp.	Omaha, Neb.				1½									
Duplex	Duplex Truck Co.	Lansing, Mich.							3½						
Duplex	Clintonville-Duplex Truck Co.	Clintonville, Wis.													
Duplex	Wisconsin Duplex Auto Co.	Oshkosh, Wis.													
Ellsworth	Mills-Ellsworth Co.	Keokuk, Iowa			1										
Fageol	Fageol Motors Co.	Oakland, Cal.				2									
Famous	Famous Trucks, Inc.	St. Joseph, Mich.													
Fargo	Fargo Motor Car Co.	Chicago, Ill.				2									
Federal	Federal Motor Truck Co.	Detroit, Mich.			1	1½	2		3½		5				
Ford	Ford Motor Co.	Detroit, Mich.			1										
Forschler	Forschler Wagon Co.	New Orleans, La.			1	1½	2								
Four Wheel Drive	Four Wheel Drive Truck Co.	Webberville, Mich.													
F W D	Four Wheel Drive Auto Co.	Clintonville, Wis.						3							
Fulton	Fulton Motor Truck Co.	Farmingdale, L. I.				1½									
Gabriel	Gabriel Motor Truck Co.	Cleveland, Ohio			1		2			4					
Garford	Garford Motor Truck Co.	Lima, Ohio			1	1½	2		3½		5		6		T
Gary	Gary Motor Truck Co.	Gary, Ind.			1	1½	2		3½						
Gem	Gem Motor Car Corp.	Grand Rapids, Mich.			1										
Geneva	Geneva Wagon Co.	Geneva, N. Y.			1										
Gerstl	Gerstl Motor Car Co.	Portland, Ore.					2½								
Giant	Chicago Pneumatic Tool Co.	Chicago, Ill.			1	1½	2		3½						
Globe	Globe Motor Truck Co.	E. St. Louis, Ill.			1	1½	2								
G M C	General Motors Truck Co.	Pontiac, Mich.			1	1½	2		3½		5				
Gramm-Bernstein	Gramm-Bernstein Motor Truck Co.	Lima, Ohio			1	1½	2	2½	3½		5				
Grant	Grant Motor Car Corp.	Cleveland, Ohio			1		2								

1919 Directory of 232 Manufacturers of Gasoline, Steam,

Name	Manufacturer	Address	MODELS IN TONS CAPACITY													
			Figures refer to capacity, not number of models													
			Under 1	1	2	3	4	5	6	7	8	9	10	11	12	13 and over
Hahn	Hahn Motor Truck & Wagon Co.	Hamburg, Pa.		1	1	2										7
Hall	Lewis-Hall Iron Works	Detroit, Mich.			2		3	5								
Harrison	Robt. Harrison Co.	S. Boston, Mass.					3									
Harvey	Harvey Motor Truck Co.	Harvey, Ill.				2		5								
Hawkeye	Hawkeye Truck Co.	Sioux City, Iowa			1	2										
Hendrickson	Hendrickson Motor Truck Co.	Chicago, Ill.			2		3									
Hewitt-Ludlow	Hewitt-Ludlow Auto Co.	San Francisco, Cal.					3									
Highway	Highway Tractor Co.	Indianapolis, Ind.														
Higrade	Higrade Motors Co.	Harbor Springs, Mich.		1												
Hoover	Hoover Wagon Co.	York, Pa.		1												
Hupmobile	Hupp Motor Car Corp.	Detroit, Mich.														
Hurlburt	Hurlburt Motor Truck Co.	New York City			2		3	5								
I H C	International Harvester Co.	Akron, Ohio		1	1	2										
Independent	Independent Motors Corp.	Port Huron, Mich.		1	2											
Indiana	Indiana Truck Corp.	Marion, Ind.		1	2		3	5								
Jumbe	Nelson Motor Truck Co.	Saginaw, Mich.			2											
Kearns	Kearns Motor Car Co.	Beavertown, Pa.			1											
Kelly-Springfield	Kelly-Springfield Motor Truck Co.	Springfield, Ohio			2	2	3	4	5	6						
Kimball	Kimball Motor Truck Co.	Los Angeles, Cal.			2	2		4	5							
Kissel	Kissel Motor Car Co.	Hartford, Wis.			2		3	5								
Kleiber	Kleiber & Co. Inc.	San Francisco, Cal.		1	2	2	3	5								T
Knox	Knox Motors Co.	Springfield, Mass.														T
Koehler	H. J. Koehlers Corp.	Newark, N. J.				3										
La France	Ward La France Motor Truck Co., Inc.	Elmira, N. Y.			2											
Lambert	Buckeye Mfg. Co.	Anderson, Ind.		1												
Landshaft	Wm. Landshaft & Son	Chicago, Ill.		1	2											
Lane	Lane Motor Truck Co.	Kalamazoo, Mich.			1	2	3									
Lange	Lange Motor Truck Co.	Pittsburgh, Pa.			2											
Lapeer	Lapeer Tractor-Truck Co.	Lapeer, Mich.														T
Larrabee	Larrabee-Deyo Motor Truck Co.	Binghamton, N. Y.		1	2	3		5								
Lippard-Stewart	Lippard-Stewart Motor Car Co.	Buffalo, N. Y.		1	1	2										
Lombard	Lombard Auto-Tractor Truck Corp.	New York City						5								
Loyal	Loyal Motor Truck Co.	Lancaster, Ohio		1												
Maccar	Maccar Truck Co.	Scranton, Pa.			1	2	3		5							
Mack	International Motor Co.	New York City		1	2		3		5							T
Manly	O'Connell Manly Motor Corp.	Waukegan, Ill.			2	2										
Master	Master Trucks, Inc.	Chicago, Ill.			2		3									
Maxfer	Maxfer Truck & Tractor Co.	Harvey, Ill.		1												
Maxwell	Maxwell Motor Co.	Detroit, Mich.		1												
Menominee	Menominee Motor Truck Co.	Menominee, Mich.		1	1	2		3	5							
Midland	Midland Motor Car & Truck Co.	Oklahoma City, Okla.														
Militor	Militor Corp.	Jersey City, N. J.														
Modern	Bowling Green Motor Car Co.	Bowling Green, Ohio			1											
Mogul	Mogul Motor Truck Co.	St. Louis, Mo.														
Mohawk	Mohawk Motor Truck Co.	Ravenna, Ohio														
Moreland	Moreland Motor Truck Co.	Los Angeles, Cal.		1	1	2		4	5							
Muskegon	Muskegon Engine Co.	Muskegon, Mich.			2											
Myers	E. A. Myers Co.	Pittsburgh, Pa.		1	1											
Nash	Nash Motors Co.	Kenosha, Wis.		1	2											
Nelson & LeMoon	Nelson & LeMoon	Chicago, Ill.		1	2		3	5								
Netco	New England Truck Co.	Fitchburg, Mass.			2											
New York	Tegetmeier & Riepe	New York City			1	2										
Niles	Niles Car & Mfg. Co.	Niles, Ohio		1	2											
Noble	Noble Motor Truck Co.	Kendallville, Ind.				2										
Norwalk	Norwalk Motor Car Co.	Martinsburg, W. Va.		1	1			4								
O K	Oklahoma Auto Mfg. Co.	Muskogee, Okla.			1		3									
Old Hickory	Kentucky Wagon Mfg. Co.	Louisville, Ky.														
Old Reliable	Old Reliable Motor Truck Co.	Chicago, Ill.			1	2	3	5								T
Oneida	Oneida Motor Truck Co.	Green Bay, Wis.		1	1	2	3	5								
Oshkosh	Oshkosh Motor Truck Mfg. Co.	Oshkosh, Wis.														
Overland	Willys-Overland Co.	Toledo, Ohio	2													
Packard	Packard Motor Car Co.	Detroit, Mich.		1	1	2	3	4	5	6						
Packet	Packet Motor Truck Co.	Minneapolis, Minn.	1													
Paige	Paige-Detroit Motor Car Co.	Detroit, Mich.														
Palmer	Palmer-Meyer Motor Car Co.	St. Louis, Mo.		1	2											
Panhard	Panhard Motors	Grand Haven, Mich.		1	1											
Parker	Parker Motor Truck Co.	Milwaukee, Wis.			2	3	4	5								
Patriot	Hebb Motors Co.	Lincoln, Neb.			1	2										
Peerless	Peerless Motor Car Co.	Cleveland, Ohio				3	4	5								
Phoenix-Centipede	Phoenix Mfg. Co.	Eau Claire, Wis.						5								
Pierce-Arrow	Pierce-Arrow Motor Car Co.	Buffalo, N. Y.			2			5								
Power	Power Truck & Tractor Co.	Detroit, Mich.			2											
Rainier	Rainier Motor Corp.	New York City		1	1											
Reliance	Reliance Motor Truck Co.	Appleton, Wis.														
Rennoc-Leslie	Rennoc-Leslie Motor Co.	Philadelphia, Pa.				2										T
Reo	Reo Motor Car Co.	Lansing, Mich.														
Republic	Republic Motor Truck Co. of America	Alma, Mich.		1	1	2	3									
Reya	Reya Co.	Napoleon, Ohio														
Riker	Locomobile Co., Inc.	Bridgeport, Conn.				3	4									
Robinson	Golden West Motors Co.	Sacramento, Cal.			2											
Rowe	Rowe Motor Mfg. Co.	Lancaster, Pa.			2	2	3	5								
Royal	Royal Motor Truck Co.	New York City		1	1	2	3	5	6	7						
Rush	Rush Motor Truck Co.	Philadelphia, Pa.														
Sandow	Sandow Motor Truck Co.	Chicago, Ill.		1	1	2	3	5								
Sanford	Sanford Motor Truck Co.	Syracuse, N. Y.				2	3	5								
Schacht	G. A. Schacht Motor Truck Co.	Cincinnati, Ohio				2	3	5								
Schleicher	Schleicher Motor Vehicle Co.	New York City				3	5									
Selden	Selden Motor Vehicle Co.	Rochester, N. Y.		1	2		3	5								
Seneca	Seneca Motor Truck Co.	Fostoria, Ohio														
Service	Service Motor Truck Co.	Wabash, Ind.		1	2		3	5								

Steam Vehicles

Electric Vehicles

Electric Industrial Trucks

[illegible]

Buyer's Guide to 1919 Gasoline Trucks

Classified According to Load Capacity and Combined
with Salient Features of Chassis

TRUCKS OF UNDER 1/2-TON CAPACITY

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Electric System	Gear-set Type	Final Drive
Overland.....Panel	\$835	104	pneu....	18.2	s&l.....	selec..	bevel

TRUCKS OF 1/2-TON CAPACITY

Briscoe.....4-24	\$885	104	pneu....	16.2	s,l&i-2...	prog..	bevel
Cortias.....A	800*	100	pneu....	15.6	.....	.....	bevel
Croce.....17	825	108	p&s....	16.9	.....	selec..	bevel
Ellsworth.....25A	885*	108	pneu....	16.9	s,l&i-2...	prog..	bevel
Gem.....	675	.....	pneu....	22.5	s&l.....	selec..	bevel
Hupmobile.....	1,350	112	pneu....	16.9	.....	selec..	bevel
Kearns.....	850	107	pneu....	16.9	s&l.....	selec..	bevel
Loyal.....	865	110	pneu....	19.6	s&l.....	selec..	int-gear
Overland.....Express	1,015	106	pneu....	27.2	s&l.....	selec..	s-bevel
Rainier.....R-5	1,250	115	pneu....	16.9	none....	selec..	worm
Rush.....D	895	105	pneu....	16.9	s&l.....	selec..	bevel
Seneca.....J	.....	108	pneu....	15.6	s,l&i.....	selec..	bevel
Studebaker.....SF	.....	112	pneu....	24.2	s,l&i-2...	selec..	bevel
Vim.....21	945	108	pneu....	14.4	lighting..	selec..	bevel

TRUCKS OF 3/4-TON CAPACITY

Atlas.....19	\$1,135	118	pneu....	19.6	s,l&i.....	selec..	bevel
D-E.....J	1,050	108	pneu....	15.6	s&l.....	selec..	worm
Forschler.....	1,535	120	solid....	15.6	.....	selec..	worm
Geneva.....1	650	96	solid....	22.1	.....	plan..	chain
G.M.C.....16	1,775	.....	pneu....	22.5	.....	selec..	bevel
Grant.....12	1,125	115	pneu....	16.9	s,l&i-2...	selec..	int-gear
Higrade.....A17	1,850	115	pneu....	19.6	s&l.....	ind-c..	worm
L.H.C.....H	1,550	115	solid....	19.6	s&l*.....	selec..	int-gear
Lippard-Stewart.....C	1,900	125	pneu....	22.5	s&l.....	selec..	bevel
Loyal.....	1,025	120	pneu....	19.6	s&l.....	selec..	int-gear
Old Hickory.....M	995	112	pneu....	16.9	s,l&i.....	selec..	bevel
Rainier.....R-2	1,350	125	pneu....	16.9	none....	selec..	worm
Reo.....F	1,250	128	pneu....	27.2	s,l&i-2...	selec..	bevel
Republic.....Despatch	1,095	110	opt.....	16.9	lighting..	selec..	int-gear
Republic.....9 Special	1,295	128	opt.....	19.6	none....	selec..	int-gear
Stewart.....6	.....	110	pneu....	15.6	.....	selec..	int-gear
Tiffin.....A	1,100	110	pneu....	19.6	none....	selec..	int-gear
White.....GBBE	2,300	133	pneu....	22.5	s&l.....	selec..	bevel

TRUCKS OF 1-TON CAPACITY

Acme.....B	\$1,950	130	solid....	22.5	opt.....	ind-c..	worm
All American.....AA	1,295	130	p&s....	16.9	none....	selec..	int-gear
Available.....1	2,250	132	solid....	22.5	.....	selec..	worm
Beck.....A	1,350	124	solid....	19.6	.....	prog..	int-gear

TRUCKS OF 1-TON CAPACITY (Cont'd)

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Electric System	Gear-set Type	Final Drive
Bessemer.....G	1,450	124	solid....	19.6	none....	selec..	int-gear
Brinton.....H	1,500	125	pneu....	16.9	.....	selec..	worm
Briscoe.....T-34	.....	121	p&s....	18.2	s,l&i-2...	prog..	int-gear
Chase.....A	1,725	138	solid....	19.6	.....	selec..	worm
Chevrolet.....T	.....	125	p&s....	21.7	s,l&i-2...	selec..	worm
Comet.....	1,575	130	solid....	19.6	stg.....	selec..	worm
Commerce.....E	1,500	126	solid....	22.5	s&l-2...	selec..	int-gear
Corbitt.....E	2,000	130	opt.....	22.5	s,l&i-2...	selec..	worm
Dart.....E	2,100	130	solid....	22.5	s&l.....	selec..	worm
D-E.....A	1,775	128	solid....	19.6	.....	selec..	worm
Denby.....12	1,650	124	solid....	19.6	s,l&i-2...	selec..	int-gear
Diamond-T.....J5	2,125	132	solid....	19.6	none....	selec..	worm
Federal.....S	1,900	132	opt.....	22.5	opt.....	selec..	worm
Forschler.....	2,000	130	solid*	19.6	.....	selec..	worm
Ford.....TT	550	124	p&s....	22.5	lighting..	plan..	worm
Gabriel.....C	2,000	136	pneu....	29.0	s&l-2...	selec..	worm
Garford.....75-C	2,500	128	opt.....	22.5	s&l.....	selec..	worm
Gary.....F	.....	130	solid....	22.5	lighting..	selec..	worm
Giant.....15	1,850	138	opt.....	19.6	lighting..	selec..	worm
Globe.....A	1,490	132	solid....	19.6	.....	selec..	int-gear
G.M.C.....21	2,125	.....	opt.....	22.5	.....	selec..	worm
Hahn.....G	1,375	127	opt.....	19.6	.....	selec..	int-gear
Higrade.....A18	2,100	115	pneu....	19.6	s&l.....	ind-c..	worm
Hoover.....15-B	1,435	120	pneu....	19.6	none....	selec..	worm
L.H.C.....F	1,850	128	solid....	19.6	s&l*.....	selec..	int-gear
Independent.....F	1,485	128*	solid*	19.6	s&l.....	selec..	worm
Indiana.....T	2,150	135	solid*	22.5	s&l-2...	selec..	worm
Kleiber.....AA	2,400	130	solid....	22.5	.....	.....	worm
Larrabee.....M	1,950	130	solid....	22.5	.....	selec..	worm
Lippard-Stewart.....H	2,250	145	solid....	22.5	s&l.....	selec..	worm
Loyal.....	1,300	130	.....	19.6	.....	selec..	int-gear
Mack.....AB	2,400	144*	solid....	25.6	opt.....	selec..	worm
Mack.....AB	2,400	144*	solid....	25.6	opt.....	selec..	chain
Maxter.....	1,195	130	p&s....	19.6	s&l.....	selec..	worm
Maxwell.....	1,025	124	solid....	21.0	lighting..	selec..	worm
Menominee.....Hurlyton	1,890	130	solid....	22.5	lighting..	selec..	worm
Moreland.....17-N	2,175	126	solid....	22.5	.....	selec..	worm
Myers.....50	1,495	130	solid*	19.6	s,l&i-2...	selec..	worm
Myers.....55	1,460	130	solid*	19.6	.....	selec..	worm
Nash.....2018	1,650	130	solid*	22.5	s,l&i-2...	selec..	int-gear
Nelson & LeMoon.....F	2,000	opt.	solid....	22.5	s&l.....	selec..	worm
Niles.....B	1,500	124	pneu....	19.6	.....	selec..	worm
Norwalk.....2000	1,495	130	pneu*	19.6	s,l&i-2...	selec..	worm
Oneida.....A	2,290	130	solid*	22.5	lighting..	ind-c..	worm
Packard.....E	2,650	126	solid*	25.6	s,l&i-2...	selec..	worm
Palmer.....	1,695	132	opt.....	22.5	.....	prog..	int-gear
Panhard.....A	1,195	130	p&s....	19.6	lighting..	selec..	int-gear
Republic.....10	1,485	124	solid....	19.6	none....	selec..	int-gear
Royal.....	2,400	128	solid....	16.9	s,l&i.....	ind-c..	worm
Sandow.....G	.....	120	solid....	19.6	.....	selec..	worm
Sandow.....CG	.....	134	solid....	19.6	.....	selec..	worm
Selden.....TXR	.....	137	solid....	19.6	s&l.....	selec..	int-gear
Selden.....TWL	.....	140	solid....	19.6	s&l.....	selec..	worm
Selden.....TXL	.....	140	solid....	19.6	s&l.....	selec..	int-gear
Service.....320	2,100	137	solid....	19.6	opt.....	selec..	worm
Signal.....F	2,400	144	solid....	27.2	none....	selec..	worm
Stewart.....8	.....	130	solid*	19.6	.....	selec..	int-gear
Studebaker.....7	.....	125	pneu....	24.2	s,l&i-2...	selec..	bevel
Superior.....A	1,600	124	p&s*....	19.6	none....	selec..	int-gear
Vim.....25	2,195	120	opt.....	22.5	.....	selec..	worm
Wichita.....A	1,850	144	solid....	19.6	lighting..	prog..	chain
Wichita.....K	2,000	144	solid....	19.6	lighting..	prog..	worm
Wilcox.....S	2,100	128	p&s....	22.5	none....	selec..	worm
Wilson.....	1,750	124	p&s*....	19.6	opt.....	selec..	worm
Witt-Will.....WD-16	2,000	120	solid*	22.5	.....	selec..	worm

ABBREVIATIONS—Types of Construction

*—with other options
—price, complete with body
cush—cushion
e & s—cushion and solid tires
dbl-red—double reduction drive

f—drive to front wheels only
4—driving on all four wheels
fric—friction

ind-c—individual clutch, constant mesh
int-gear—internal gear
plan—planetary
pneu—pneumatic
p&s—pneumatic and solid

prog—progressive
selec—selective sliding gearset
sp-bev—spiral bevel
s, l & i—starting, lighting and ignition

s, l & i-2—2-unit starting, lighting and ignition system
s & l-2—2-unit starting and lighting system

TRUCKS OF 1½-TON CAPACITY

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Electric System	Gear-set Type	Final Drive
Acason.....	B \$2,500	150	solid	22.5	lighting*	selec.	worm
Atterbury.....	TR 2,575	140½	solid	27.2	none...	selec.	worm
Beck.....	B 1,950	144	solid	22.5	.....	prog.	int-gear
Bessemer.....	H 1,945	144	solid	22.5	opt.	prog.	int-gear
Bethlehem.....	D 1,965	136	solid	22.5	s, l&i-2	selec.	int-gear
Brookway.....	J2 2,450	140	solid	22.5	none...	selec.	worm
Chase.....	C 2,025	149	solid	19.6	.....	selec.	worm
Collier.....	16 1,375	128	pneu.	19.6	s, l&i-2	selec.	worm
Concord.....	A 2,450	140	solid	22.5	.....	selec.	worm
Corbitt.....	D 2,400	138	opt.	22.5	s, l&i-2	selec.	worm
D-E.....	B 2,075	144	solid	22.5	.....	selec.	worm
Defiance.....	B 1,795	135	solid	22.5	lighting	selec.	int-gear
Diamond-T.....	J4 2,550	154	solid	22.5	none...	selec.	worm
Douglas.....	TA 2,000	127	solid*	27.2	lighting	selec.	int-gear
Federal.....	T 2,350	144	solid	27.2	opt.	selec.	worm
Forschler.....	2,375	138	solid	19.6	.....	selec.	worm
Fulton.....	FX 1,850	136	solid	18.2	opt.	selec.	int-gear
Garford.....	66-B 3,000	144	opt.	22.5	s&l	selec.	worm
Gary.....	G 1,444	144	solid	29.0	lighting	selec.	worm
Giant.....	14 2,400	138	solid	19.6	lighting	selec.	worm
Globe.....	B 1,850	144	solid	22.5	.....	selec.	int-gear
G.M.C.....	31 2,500	144	solid	22.5	none...	selec.	worm
Gramm-Bernstein.....	W 2,450	130	solid	22.5	ind-c	selec.	worm
Grant.....	10 1,885	124	opt.	22.5	s, l&i-2	selec.	int-gear
Grant.....	11 1,935	140	opt.	22.5	s, l&i-2	selec.	int-gear
Hahn.....	C 1,950	135	opt.	27.2	.....	selec.	worm
Hawkeye.....	K 1,900	148	opt.	22.5	lighting	selec.	int-gear
I.H.C.....	K 2,200	129	solid	19.6	s&l-2	selec.	int-gear
Indiana.....	Q 2,600	144	opt.	27.2	s&l-2	selec.	worm
Kearns.....	1,800	136	solid	16.9	.....	.....	.....
Kelly-Springfield.....	K-31 2,750	144	solid	22.5	s&l-2*	selec.	chain
Kelly-Springfield.....	K-32 2,750	144	solid	22.5	s&l-2	selec.	worm
Kimball.....	2A 2,400	144	solid	25.6	.....	selec.	worm
Kissel.....	Utility 2,073	152	solid	24.2	s&l	selec.	worm
Kleiber.....	A 2,650	140	solid	27.2	.....	selec.	worm
Koehler.....	K 1,450	129	solid	19.6	none...	selec.	int-gear
Lane.....	G 2,250	135	solid	22.5	.....	selec.	worm
Lippard-Stewart.....	F 2,750	158	solid	27.2	s&l	selec.	worm
Maccar.....	L 2,750	150	opt.	27.2	none...	selec.	worm
Mack.....	AB 2,800	162*	solid	25.6	opt.	selec.	worm
Mack.....	AB 2,800	162*	solid	25.6	opt.	selec.	chain
Manly.....	30 2,050	144	solid	22.5	.....	selec.	worm
Menominee.....	H 2,475	130	solid	22.5	lighting	selec.	worm
Modern.....	30 1,800	132	solid	22.5	.....	selec.	worm
Moreland.....	17B 2,930	150	solid	27.2	.....	selec.	worm
Myers.....	70 1,750	130	solid	19.6	s, l&i-2	selec.	worm
Myers.....	75 1,700	130	solid	19.6	s, l&i-2	selec.	worm
Norwalk.....	3000 1,750	130	opt.	19.6	s, l&i-2	selec.	worm
O K.....	3T 2,250	150	solid	27.2	none...	selec.	worm
Old Reliable.....	WA 2,350	150	solid	25.6	opt.	selec.	worm
Oneida.....	B 2,650	130	solid	27.2	lighting	ind-c	worm
Packard.....	E 3,000	126	solid*	25.6	s, l&i-2	selec.	worm
Panhard.....	D 1,395	130	solid	19.6	lighting	selec.	int-gear
Patriot.....	2,150	135	solid	22.5	.....	selec.	int-gear
Rainier.....	R4 1,595	125	p&s	16.9	none...	selec.	worm
Rainier.....	R6 1,890	133	c&s	19.6	none...	selec.	worm
Republic.....	11X 1,775	144	solid	22.5	none...	selec.	int-gear
Royal.....	2,800	128½	solid	22.5	s, l&i	ind-c	worm
Sandow.....	H 1,388	138	solid	19.6	none...	selec.	worm
Signal.....	H 2,700	144	solid	27.2	none...	selec.	worm
Stewart.....	9 1,444	144	solid*	22.5	none...	selec.	int-gear
Sullivan.....	F 2,350	129	solid	22.5	none...	selec.	worm
Texan.....	1,375	.....	p&s	.....	.....	selec.	worm
Tiffin.....	GW 2,075	135	solid	22.5	none...	s-sec	worm
Triangle.....	A 2,185	144	solid	22.5	none...	selec.	int-gear
United.....	AX 1,333	133	solid	22.5	opt.	selec.	worm
Universal.....	G 1,333	133*	solid	22.5	lighting	selec.	worm
White.....	TBC 3,300	145	p&s	22.5	s&l	selec.	dbl-red
White Hickory.....	H 2,400	144	solid	22.5	none...	prog.	worm
Wichita.....	L 2,350	144	solid	19.6	lighting	prog.	worm
Wilcox.....	X 2,775	144	solid	29.0	none...	selec.	worm
Winther.....	38 2,250	132	solid	22.5	s&l	selec.	int-gear
Wisconsin.....	B 1,750	136	solid	19.6	none...	selec.	worm
Wolverine.....	C 2,250	140	solid	22.5	s&l-2	selec.	int-gear

TRUCKS OF 2-TON CAPACITY

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Electric System	Gear-set Type	Final Drive
Acason.....	H \$2,850	150	solid	29.0	lighting	selec.	worm
Acme.....	A 2,750	148	solid	27.2	lighting	ind-c	worm
Air-O-Flex.....	183 146	146	solid	27.2	s, l&i-2	selec.	int-gear
Armleder.....	HW 156	156	solid	27.2	none...	selec.	worm
Atterbury.....	7C 2,975	153½	solid	27.2	none...	selec.	worm
Autocar.....	XXI-F 2,050	97	opt.	18.1	none...	prog.	dbl-red
Available.....	2 2,950	144	solid	27.2	none...	selec.	worm
Beck.....	C 2,250	144	solid	27.2	.....	selec.	int-gear
Bessemer.....	J 2,490	158	solid	27.2	opt.	selec.	int-gear
Bourne.....	VM 3,500	143	solid	25.6	s&l	selec.	worm
Brookway.....	K3 2,850	148	solid	27.2	none...	selec.	worm
Clydesdale.....	65 163	163	solid	27.2	.....	selec.	worm
Columbia.....	E 2,350	144	solid	27.2	lighting	selec.	int-gear
Corbitt.....	C 3,000	148	solid	27.2	none...	selec.	worm
Dart.....	CC4 2,950	150	solid	29.0	s&l	selec.	worm
D-E.....	D 2,150	128	solid	22.5	.....	selec.	worm
DeKalb.....	E2 2,100	134	solid	27.2	none...	selec.	worm
Denby.....	13 2,350	144	solid	22.5	s, l&i-2	selec.	int-gear
Diamond-T.....	J3 2,925	154	solid	27.2	none...	selec.	worm
Dorris.....	K4 2,985	162	solid	29.0	s&l-2	selec.	worm
Fageol.....	2 3,300	144	solid	25.6	.....	selec.	worm
Fargo.....	P 2,200	144	solid	22.5	none...	selec.	int-gear
Federal.....	U 2,600	144	solid	27.2	opt.	selec.	worm
Forschler.....	2,750	144*	solid*	27.2	.....	selec.	worm
Gabriel.....	E 3,250	156	opt.	29.0	s&l-2	selec.	worm
Garford.....	70B 3,300	142	opt.	29.0	s&l	selec.	worm
Gary.....	H 1,566	156	solid	29.0	lighting	selec.	worm
Giant.....	16 2,850	144	pneu.	27.2	lighting	selec.	worm
Globe.....	C 2,190	154	solid	27.2	none...	selec.	int-gear
G.M.C.....	41 2,800	144	solid	27.2	none...	selec.	worm
Gramm-Bernstein.....	W 2,750	146	solid	22.5	none...	ind-c	worm
Grant.....	15 2,150	124	opt.	22.5	s, l&i-2	selec.	int-gear
Grant.....	16 2,250	140	opt.	22.5	s, l&i-2	selec.	int-gear
Hall.....	2,675	156	solid	27.2	none...	selec.	worm
Hawkeye.....	L 2,500	148½	opt.	22.5	lighting	selec.	int-gear
Hendrickson.....	2,850	140	solid	29.0	none...	selec.	worm
Hurlburt.....	3,500	148	solid	29.0	lighting	selec.	worm
I.H.C.....	G 2,600	138½	solid	25.6	s&l*	selec.	int-gear
Independent.....	G 2,250	144	solid	27.2	none...	selec.	worm
Indiana.....	D 2,800	150	opt.	27.2	s&l-2	selec.	worm
Jumbo.....	2,500	144	solid	.....	opt.	selec.	int-gear
Kimball.....	4A 154	154	solid	25.6	.....	selec.	worm
Kissel.....	Freighter 3,832	168	solid	29.0	s&l	selec.	worm
Kleiber.....	BB 2,950	140	solid	29.0	.....	selec.	worm
La France (Ward).....	2A 3,500	154	solid	27.2	s, l&i-2	selec.	worm
Lange.....	B 2,950	136	solid	27.2	ind-c	chain	.....
Lippard-Stewart.....	G 3,050	158	solid	27.2	s&l	selec.	worm
Mack.....	AB 3,000	162*	solid	25.6	opt.	selec.	worm
Mack.....	AB 3,000	162*	solid	25.6	opt.	selec.	chain
Manly.....	40 2,350	156	solid	22.5	.....	selec.	worm
Master.....	M 2,390	144	solid	29.0	.....	selec.	int-gear
Master.....	O 2,490	170	solid	29.0	.....	selec.	int-gear
Master.....	W 2,590	144	solid	29.0	s, l&i	selec.	worm
Master.....	WL 2,690	170	solid	29.0	s, l&i	selec.	worm
Menominee.....	D 2,950	144	solid	27.2	.....	selec.	worm
Muskegon.....	20 2,325	144	solid	27.2	none...	selec.	int-gear
Nash.....	4017 3,250	124	solid	29.0	s, l&i-2	ind-c	int-gear-4
Nash.....	3018 2,175	144	solid	22.5	s, l&i-2	selec.	int-gear
Nelson & Le Moon.....	F 2,775	opt	solid	27.2	s&l	selec.	worm
Netco.....	D 2,500	144	solid	27.2	none...	selec.	worm
Niles.....	E 2,400	140	solid	27.2	.....	selec.	worm
Oneida.....	C 3,000	144	solid*	27.2	lighting	ind-c	worm
Packard.....	E 3,400	144	solid*	25.6	s, l&i-2	selec.	worm
Palmer.....	2,595	144	solid	27.2	.....	prog.	worm
Parker.....	3,150	150	solid*	29.4	s, l&i-2	selec.	worm
Pierce-Arrow.....	X4 3,750	150	solid*	25.6	s, l&i-2	selec.	worm
Power.....	150	150	pneu.	27.2	.....	selec.	worm
Republic.....	12X-12A 2,150	144	solid	27.2	none...	selec.	int-gear
Rove.....	CDW 3,000	144	solid	25.6	none...	selec.	worm
Royal.....	3,200	132	solid	25.6	s, l&i	ind-c	worm
Sandow.....	J 165	165	solid	27.2	.....	selec.	worm
Schacht.....	3 3,150	144	solid	29.0	none...	selec.	worm
Selden.....	JCB&JCBL 150	150	solid	27.2	s&l	selec.	int-gear
Selden.....	JWB&JWB 150	150	solid	27.2	s&l	selec.	worm
Service.....	340 3,000	160	solid	29.0	opt.	selec.	worm
Shaw.....	M3 2,700	153	solid	27.2	none...	selec.	worm
Signal.....	J 3,100	150	solid	27.2	none...	selec.	worm
Standard.....	70 2,800	140	solid	27.2	none...	prog.	worm
Steele.....	C 2,500	115	solid	27.2	none...	ind-c	chain
Stewart.....	7 156	156	solid	27.2	.....	selec.	int-gear
Sullivan.....	E 2,850	150	solid	22.5	.....	selec.	worm
Superior.....	C 2,200	144	solid	22.5	none...	selec.	int-gear
Traffic.....	1,395	133	solid	19.6	none...	selec.	int-gear

ABBREVIATIONS—Types of Construction

*—with other options
 —price, complete with body
 cush—cushion
 c & s—cushion and solid
 tires
 dbl-red—double reduction drive

f—drive to front wheels only
 4—driving on all four wheels
 fric—friction

ind-c—individual clutch, constant mesh
 int-gear—internal gear
 plan—planetary
 pneu—pneumatic
 p&s—pneumatic and solid

prog—progressive
 selec—selective sliding gearset
 sp-bev—spiral bevel
 s, l & i—starting, lighting and ignition

s, l & i-2—2-unit starting, lighting and ignition system

s & l-2—2-unit starting and lighting system

TRUCKS OF 2-TON CAPACITY (Cont'd)

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Electric System	Gear-set Type	Final Drive
Tower.....F	\$2,750	146	solid	27.2	none	selec	worm
Universal.....D		132	solid	29.0	lighting	selec	chain
Velie.....25A	2,050	150*	solid	27.2	none	selec	worm
Vim.....22	3,465	142	solid	22.5			worm
Wichita.....B	2,500	144	solid	19.6	lighting	prog	chain
Wilson.....	2,800	144	solid	27.2	opt	selec	worm
Winther.....48	3,200	150	solid	25.6	s&l	selec	int-gear

TRUCKS OF 2½-TON CAPACITY

Bethlehem.....E	\$2,365	144	solid	25.6	s&l&i-2	selec	int-gear
Brinton.....F	3,000	140	solid	27.2		selec	worm
Chase.....B	2,470	160	solid	27.2		selec	worm
Concord.....B	2,800	150	solid	29.0		selec	worm
Corbitt.....B	3,800	148	solid	27.2	none	selec	worm
D-E.....C	2,750	150	solid	29.0		selec	worm
Densab.....E2½	2,660	136	solid	32.4	none	selec	int-gear
Gary.....HU		162	solid	29.0	lighting	selec	worm
Gramm-Bernstein.....W	3,350	156	solid	29.0		ind-c	worm
Hahn.....E	2,500	145	opt	32.4		selec	worm
Harvey.....WFA	3,000	150	solid	29.0	none	selec	worm
Jumbo.....A	2,250	144	solid	29.0	none	selec	int-gear
Kelly-Springfield.....K-35	3,250	144	solid	22.5	s&l-2	selec	chain
Kelly-Springfield.....K-36	3,250	144	solid	22.5	opt	selec	worm
Kimball.....6A	3,250	154*	solid	29.0		selec	worm
Kleiber.....B	3,500	150	solid	32.4		selec	worm
Koehler.....L	1,985	152	solid	19.6	none	selec	int-gear
Lane.....H	2,850	150	solid	29.0		selec	worm
Larrabee.....CD	3,000	154	solid	27.2		selec	worm
Maccar.....H	3,300	162	solid	32.4	none	selec	worm
Manly.....50	2,800	156	solid	25.6	none	selec	worm
Moreland.....17C	3,500	168	solid	32.4		selec	worm
Noble.....NW2	2,675	148	solid	27.2	lighting	selec	worm
Old Reliable.....WB	3,250	150	solid	29.0	lighting	selec	worm
Patriot.....	3,150	156	solid	27.2		selec	worm
Rennec-Leslie.....M	2,895	144	solid	27.2	lighting	selec	worm
Rowe.....CDW	3,250	150	solid	25.6	none	selec	worm
Royal.....	3,500	132½	solid	29.0	s&l&i	ind-c	worm
Sanford.....25	3,000	156	solid	27.2	none	selec	worm
Schacht.....	3,500	156	solid	29.0	none	selec	worm
Sterling.....	3,300	156	solid	29.0	lighting	selec	worm
Tiffin.....MW	2,750	148	solid	27.2		selec	worm
Union.....B	2,375	152	solid	25.6	none	selec	int-gear
U. S.....E	2,800	144	solid	27.2		ind-c	chain
U. S.....H	3,250	144	solid	27.2		selec	worm
United.....BX		148	solid	29.0		selec	worm
Wichita.....R	2,950	144	solid	22.5	lighting	prog	worm
Wilcox.....Q	3,250	150	solid	29.0	none	selec	worm
Wisconsin.....C	2,850	156	solid	25.6	none	selec	worm
Witt-Will.....WD18	2,950	144	solid*	27.2	none	selec	worm

TRUCKS OF 3-TON CAPACITY

A&B.....3T		144	solid	42.8	none	elec	int-gear
Beech Creek.....3A	\$3,850	132	solid	29.0		selec	bevel-4
Chase.....X	2,800	160	solid	27.2		selec	worm
Denby.....15	2,775	144	solid	22.5	s&l&i-2	selec	int-gear
F W D.....B	4,600	124	solid	36.1		ind-c	bevel-4
O K.....IT	2,985	158	solid	29.0	none	selec	worm
Packard.....E	4,100	156	solid*	32.4	s&l&i-2	selec	worm
Parker.....	3,700	160	solid	29.4	s&l-2	selec	worm
Peerless.....TC	4,125	151	solid	32.4	none	selec	chain
Riker.....B		150	solid	29.0	s&l-2	selec	worm

TRUCKS OF 3-TON CAPACITY (Cont'd)

Rowe.....DEW	\$3,800		solid	25.6	none	selec	worm
Schleicher.....	3,675	150*	solid	29.0			chain
Steele.....D	3,000	127	solid	40.0		ind-c	chain
Vim.....23	4,345	175	solid	29.0		selec	worm
Walter.....MO		108	solid	30.6	none	selec	ext-gear
Ward La France.....3A	3,975	154	solid	27.2	s&l-2	selec	worm
White.....TJ	4,100	174	solid	22.5		selec	dbl-red
Winther.....68	3,900	150	solid	25.6	s&l	selec	int-gear

TRUCKS OF 3½-TON CAPACITY

Acason.....L	\$3,700	172	solid	29.0	lighting	selec	worm
Acme.....C	3,650	168	solid	32.4	lighting	ind-c	worm
American.....D4		135	solid*	29.0		ind-c	worm
Armleder.....KW		186	solid	32.4	none	selec	worm
Atterbury.....7D	3,875	167½	solid	32.4	none	selec	worm
Available.....3	4,200	150	solid	32.4	none	selec	worm
Bethlehem.....F	2,365	162	solid	30.6	s&l&i	selec	int-gear
Bessemer.....K	3,450	175	solid	32.4	opt	selec	int-gear
Bourne.....XM	4,200	160	solid	29.0	s&l	selec	worm
Brockway.....R	3,750	164	solid	32.4	none	selec	worm
Chase.....O	3,000	175	solid	32.4	s&l	selec	worm
Clydesdale.....90		180	solid	32.4		selec	worm
Corbitt.....A	4,000	168	solid	32.4	none	ind-c	worm
Couple-Gear.....HC	6,000	144	solid	36.1	lighting	elec	bevel-4
Dart.....L	4,000	160	solid	32.4	s&l	selec	worm
Diamond-T.....LB	4,150	170	solid	32.4	none	selec	worm
Duplex.....E	4,000	130	solid	29.0	none	selec	int-gear-4
Federal.....W	3,350	156	solid	32.4	opt	selec	worm
Garford.....77-B	4,300	128	opt	29.0	lighting	selec	worm
Gary.....K		162	solid	32.4	lighting	selec	worm
Giant.....17	3,850	176	solid	32.4	lighting	selec	worm
G.M.C.....71	3,950		solid	32.4	none	selec	worm
Gramm-Bernstein.....W	4,000	158	solid	32.4		ind-c	worm
Hall.....	3,500	144	solid	32.4		selec	worm
Harvey.....WHA	3,900	160	solid	29.0		selec	worm
Hendrickson.....	3,600	160	solid	32.4		ind-c	worm
Hurlburt.....	4,250	146	solid	32.4	lighting	selec	worm
Indiana.....R	3,450	156	opt	30.6	s&l-2	selec	worm
Kelly-Springfield.....K-40	4,250	150	solid	32.4	s&l-2	selec	chain
Kissel.....Heavy Duty	3,905	168	solid	29.0	s&l	selec	worm
Kleiber.....C	4,100	158	solid	32.4		selec	worm
Lane.....K	3,700	160	solid	33.7		selec	worm
Larrabee.....A	3,950	172	solid	32.4		selec	worm
Maccar.....M	4,100	174	solid	32.4	none	selec	worm
Mack.....AC	4,600	180*	solid	40.0	opt	selec	chain
Master.....A	3,890	158	solid	32.4	s&l	selec	worm
Menominee.....G	3,880	160	solid	32.4		selec	worm
Nelson & LeMoon.....F	3,750	opt	solid	32.4	s&l	selec	worm
Old Reliable.....WC	4,000	160	solid	29.0	lighting	selec	worm
Oneida.....D	3,700	160	solid*	32.4	lighting	ind-c	worm
Republic.....TX	3,450	165	solid	29.0	none	selec	int-gear
Royal.....	4,200	158	solid	32.4	s&l&i	ind-c	worm
Sandow.....		175	solid	32.4		selec	worm
Sanford.....35	3,975	174	solid	32.4	none	selec	worm
Schacht.....	3,950	168	solid	29.0	none	selec	worm
Selden.....N3		164	solid	32.4	s&l	selec	worm
Service.....370	3,900	171	solid	29.0	s&l-2	selec	worm
Service.....375	4,200	171	solid	32.4	s&l-2	selec	worm
Signal.....M	4,100	168	solid	32.4	none	selec	worm
Standard.....66	3,675	160	solid	32.4	none	selec	worm
Sterling.....	4,325	162	solid	29.0	lighting	ind-c	worm
Tiffin.....PW	3,600	160	solid	32.4	s&l&i-2	selec	worm
Titan.....Transport	4,300	162	solid	32.4	lighting	ind-c	int-gear
U. S.....D	3,500	162	solid	32.4		selec	chain
U. S.....J	3,950	162	solid	32.4		selec	worm
United.....CX		160	solid	32.4		selec	worm
Universal.....L		156	solid	29.0	lighting	selec	chain
Velie.....26A	3,900	172*	solid	32.4		selec	worm
Weier-Smith.....		153	solid	32.4		selec	worm
Wichita.....O	3,750	165	solid	32.4	lighting	prog	worm
Wilcox.....P	3,950	154	solid	29.0		selec	worm
Wilson.....	3,800	160	solid	32.4	opt	selec	worm

ABBREVIATIONS—Types of Construction

*—with other options
—price, complete with body
cush—cushion
c & s—cushion and solid tires
abl-red—double reduction drive

f—drive to front wheels only
4—driving on all four wheels
fric—friction

ind-c—individual clutch, constant mesh
int-gear—internal gear
plan—planetary
pneu—pneumatic
p&s—pneumatic and solid

prog—progressive
selec—selective sliding gearset
sp-bev—spiral bevel
s, l & i—starting, lighting and ignition

s, l & i-2—2-unit starting, lighting and ignition system
s & l-2—2-unit starting and lighting system

TRUCKS OF 4-TON CAPACITY

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Electric System	Gear-set Type	Final Drive
Gabriel.....F	\$4,300	180	solid....	32.4	s&l-2....	selec..	worm
Kelly-Springfield...K-45	4,400	150	solid....	32.4	s&l-2....	selec..	chain
Kimball.....8A		164	solid....	36.1		selec..	worm
Moreland.....17-G	4,500	186	solid....	36.1		selec..	worm
Noble.....NW4	3,750	168	solid....	32.4	lighting..	selec..	worm
Packard.....E	4,450	156	solid*	32.4	s,l&i-2....	selec..	worm
Parker.....	4,250	160	solid....	33.7	s&l-2....	selec..	worm
Peerless.....TC	4,150	151	solid....	none..		selec..	chain
Riker.....BE		150	solid....	29.0	s&l-2....	selec..	worm
Steele.....BA	3,500	127	solid....	40.0		ind-c..	chain
Winther.....88	4,300	156	solid....	29.0	s&l....	selec..	int-gear

TRUCKS OF 5-TON CAPACITY

A & B.....5T		144	solid....	42.8	none..	elec..	int-gear
Acason.....M	\$4,700	172	solid....	36.1	lighting..	ind-c..	worm
Acme.....E	4,750	180	solid....	36.1	none..	selec..	worm
American.....F4		144	solid*	32.4		ind-c..	worm
Atterbury.....8E	4,975	167½	solid....	36.1	lighting..	selec..	worm
Autohorse.....10	2,100		solid....	22.5	none..	selec..	int-gear
Available.....5	4,900	168	solid....	32.4		selec..	worm
Brockway.....T	4,850	172	solid....	36.1		selec..	worm
Clydesdale.....120B		204	solid....	36.1		selec..	worm
Corbitt.....AA	4,500	168	solid....	32.4	none..	ind-c..	worm
Couple-Gear.....AC	6,600	144*	solid....	44.1	lighting..	elec..	bevel-4
D-E.....E	4,500	170	solid....	32.4		selec..	worm
Denby.....210	4,900	170	solid....	32.4		selec..	int-gear
Diamond-T.....R	4,950	170	solid....	32.4	none..	selec..	worm
Federal.....Y	4,400	156	solid....	32.4	opt....	selec..	worm
Garford.....68	5,000	128	solid....	36.1	lighting..	selec..	chain
G.M.C.....101	4,550		solid....	32.4		ind-c..	worm
Gramm-Bernstein...W	5,000	168	solid....	36.1		ind-c..	worm
Hall.....	4,500	144	solid....	32.4		selec..	worm
Harvey.....WKA	5,000	160	solid....	32.4		selec..	worm
Hurlburt.....	5,250	156	solid....	32.4	lighting..	selec..	worm
Indiana.....L	4,600	167	opt....	36.1	s&l-2....	selec..	worm
Kelly-Springfield...K-50	4,900	150	solid....	32.4	s&l-2....	selec..	chain
Kimball.....10-A		164	solid....	41.6		selec..	worm
Kissel.....Dreadnaught	4,785	180	solid....	29.0	s&l....	selec..	worm
Kleiber.....D	5,100	170	solid....	44.2		selec..	worm
Larrabee.....T	4,750	176	solid....	32.4		selec..	worm
Lombard.....5				79.5		selec..	worm
Menominee.....J	4,950	160	solid....	32.4		selec..	worm
Moreland.....17J	5,000	168	solid....	36.1		selec..	worm
Nelson & Le Moon...	4,750	opt..	solid....	32.4	s&l....	selec..	worm
Old Reliable.....WD	5,000	166	solid....	36.1	lighting..	selec..	worm
Old Reliable.....CO	5,000	126	solid....	36.1	none..	selec..	chain*
Onida.....E	4,750	170	solid....	44.2	lighting..	ind-c..	worm
Packard.....E	5,150	156	solid*	40.0	s,l&i-2....	selec..	worm
Parker.....	5,000	168	solid....	33.7	s&l-2....	selec..	worm
Peerless.....TC	4,700	151	solid....	32.4	none..	selec..	chain
Pierce-Arrow.....R-9	5,500	168	solid*	38.2	s,l&i-2....	selec..	worm
Rowe.....FW	4,900		solid....	36.1		selec..	worm
Royal.....	5,000	168	solid....	38.1	s&l....	ind-c..	worm
Sandow.....		163	solid....	36.1		selec..	worm
Sanford.....50	4,750	174	solid....	32.4	none..	selec..	worm
Schacht.....	4,950	168	solid....	29.0	none..	selec..	worm
Schleicher.....	4,725	150*	solid....	40.0	none..	selec..	chain
Selden.....DL		170	solid....	32.4	s&l....	selec..	worm
Service.....400	5,000	171½	solid....	32.4	s&l-2....	selec..	worm
Signal.....R	5,100	180	solid....	36.1	none..	selec..	worm
Standard.....86	4,650	160	solid....	32.4	none..	prog..	worm
Steele.....A	4,000	127	solid....	40.0		ind-c..	chain
Sterling.....	5,100	168	solid....	36.1	lighting..	ind-c..	worm
Tiffin.....RW	4,650	168	solid....	33.7	s,l&i-2....	selec..	worm
United.....VX		160	solid....	32.4		selec..	worm
U. S.....K	4,850	168	solid....	36.1		selec..	worm
Walter.....F	5,700	140	solid....	32.4	s,l&i-2....	selec..	int-gear
White.....TG	5,000	174	solid....	29.0		selec..	dbl-red

ABBREVIATIONS—Types of Construction

*—with other options
—price, complete with body
cush—cushion
c & s—cushion and solid tires
dbl-red—double reduction drive

f—drive to front wheels only
4—driving on all four wheels
fric—friction

ind-c—individual clutch, constant mesh
int-gear—internal gear
plan—planetary
pneu—pneumatic
p&s—pneumatic and solid

prog—progressive
selec—selective sliding gearset
sp-bev—spiral bevel
s, l & i—starting, lighting and ignition

s, l & i-2—unit starting, lighting and ignition system
s & l-2—unit starting and lighting system

TRUCKS OF 5-TON CAPACITY (Cont'd)

Name and Model	Chassis Price	Wheel-base, Inches	Tires	N.A.C.C. Horse-power	Electric System	Gear-set Type	Final Drive
Wichita.....C	\$4,600	165	solid....	32.4	lighting..	prog..	worm
Wilcox.....W	5,000	162	solid....	36.1	none..	selec..	worm
Winther.....108	5,000	162	solid....	36.1	s&l....	selec..	int-gear

TRUCKS OF 5½-TON CAPACITY

Maccar.....U	\$5,000	174	solid....	45.6	none..	selec..	worm
Mack.....AC	5,250	180*	solid....	40.0	opt....	selec..	chain

TRUCKS OF 6-TON CAPACITY

Doane.....1919	\$5,650	178	solid....	36.1	none..	selec..	chain
Garford.....68	5,300	128	solid....	41.6	lighting..	selec..	chain
Kelly-Springfield...K-60	5,200	150	solid....	32.4	s&l-2....	selec..	chain
Packard.....E	5,400	156	solid*	40.0	s,l&i-2....	selec..	worm
Royal.....	5,400	168	solid....	42.2	s,l&i....	ind-c..	worm
Tiffin.....SW	4,850	168	solid....	33.7	s,l&i-2....	selec..	worm
Titan.....Heavy Duty	5,150	156	solid....	32.4	lighting..	ind-c..	int-gear
Winther.....128	5,250	162	solid....	42.2	s&l....	selec..	int-gear

TRUCKS OF 7-TON CAPACITY

Hall.....	\$4,500	144	solid....	32.4		selec..	chain
Old Reliable.....CP	6,000	136	solid....	33.1	none..	selec..	chain
Royal.....	6,500	168	solid....	44.2	s&l....	ind-c..	worm
Sterling.....	5,600	168	solid....	36.1	lighting..	ind-c..	chain
Winther.....148	5,500	162	solid....	42.2	lighting..	selec..	int-gear

TRUCKS OF 7½-TON CAPACITY

Mack.....AC	\$5,500	180*	solid....	40.0	opt....	selec..	chain
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TRACTORS

Acason.....Light	\$2,950	114	solid....	29.0	lightg*	selec..	worm
Acason.....Heavy	4,300	130	solid....	36.1	lightg*	selec..	worm
Columbia.....T	2,350	112	solid....	27.2	lighting..	selec..	int-gear
Garford.....70B	3,400	116	solid....	29.0	lightg*	selec..	worm
Garford.....77	4,400	105	solid....	36.1	lighting..	selec..	worm
Garford.....68	5,100	102	solid....	41.6	lighting..	selec..	chain
Harvey.....HT	4,000	125	solid....	32.4	s&l....	selec..	worm
Knox.....35	5,500	108½	solid....	40.0	s,l&i-2....	selec..	chain
Knox.....36	6,000	108½	solid....	40.0	s,l&i-2....	selec..	chain
Koehler.....KT	1,750	106	solid....	19.6	none..	selec..	int-gear
Koehler.....LT	2,165		solid....	19.6	none..	selec..	int-gear
Lapeer.....	1,900	90	solid....	19.6		selec..	int-gear
Lapeer.....	2,500	90	solid....	27.2		selec..	int-gear
Mack.....AE		120	solid....	25.6	opt....	selec..	chain
Mack.....AC	4,600	119	solid....	40.0	opt....	selec..	chain
Mack.....AC	5,250	119	solid....	40.0	opt....	selec..	chain
Mack.....AC	5,500	119	solid....	40.0	opt....	selec..	chain
Rennoc-Leslie-Tractor B	2,895	116	solid....	27.2	lighting..	selec..	worm
Transport.....N	2,750	80	solid....	22.5		selec..	worm
Watson.....	4,050	80	solid....	32.4	none..	selec..	worm

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Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Make of Engine	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
Mack, L.	1	2,750 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, M.	2	3,300 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, N.	3	4,100 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, O.	4	4,900 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, P.	5	5,700 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, Q.	6	6,500 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, R.	7	7,300 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, S.	8	8,100 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, T.	9	8,900 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, U.	10	9,700 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, V.	11	10,500 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, W.	12	11,300 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, X.	13	12,100 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, Y.	14	12,900 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, Z.	15	13,700 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AA.	16	14,500 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AB.	17	15,300 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AC.	18	16,100 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AD.	19	16,900 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AE.	20	17,700 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AF.	21	18,500 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AG.	22	19,300 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AH.	23	20,100 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AI.	24	20,900 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AJ.	25	21,700 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AK.	26	22,500 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AL.	27	23,300 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AM.	28	24,100 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AN.	29	24,900 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AO.	30	25,700 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AP.	31	26,500 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AQ.	32	27,300 36x4	36x5	36x5	Cont.	4-1x5	Bech	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AR.														

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Name and Model	Tons Capacity	Chassis Price	Front Tires	Name of Engine	No. Cyl. Bore and Stroke	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Final Drive	Axle	Steering Gear
O. K. 3T	11	2,250	36x5	Buda	4-4 1/2x5 1/2	Eise.	none	Pierce	Zenith	Muncie	Muncie	Chgo.	Ross
O. K. 4T	3	2,985	36x6	Buda	4-4 1/2x5 1/2	Eise.	none	Pierce	Car.	Fulcr	Fulcr	Saisy	C.A.S.
Old Hickory M.	13	3,995	36x6	Wye	4-4 1/2x5 1/2	Besch.	opt.	Mon.	Ray	B-Lipe	B-Lipe	Shel.	Ross
Old Relic, N-15	23	2,350	34x3 1/2	Wis.	4-4 1/2x5 1/2	Besch.	opt.	Mon.	Ray	B-Lipe	B-Lipe	Shel.	Ross
Old Relic, N-25	23	3,250	36x6	Wis.	4-4 1/2x5 1/2	Besch.	opt.	Mon.	Ray	B-Lipe	B-Lipe	Shel.	Ross
Old Relic, N-35	23	4,000	36x6	Wis.	4-4 1/2x5 1/2	Besch.	opt.	Mon.	Ray	B-Lipe	B-Lipe	Shel.	Ross
Old Relic, N-50	5	5,000	36x6	Wauk.	4-4 1/2x5 1/2	Besch.	none	Mon.	Strom.	Univ.	Univ.	Shel.	Ross
Old Relic, C-0	5	6,000	36x6	Wauk.	4-4 1/2x5 1/2	Besch.	none	Mon.	Strom.	Univ.	Univ.	Shel.	Ross
Oneida A	7	2,250	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Oneida B	14	2,650	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Oneida C	14	3,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Oneida D	23	3,750	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Panel	23	4,100	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	5,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	6,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	7,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	8,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	9,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	10,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	11,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	12,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	13,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	14,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	15,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	16,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	17,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	18,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	19,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	20,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	21,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	22,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	23,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	24,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	25,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	26,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	27,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	28,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	29,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	30,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	31,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	32,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	33,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	34,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	35,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	36,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	37,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	38,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	39,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	40,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	41,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	42,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	43,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	44,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	45,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	46,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	47,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	48,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	49,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	50,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	51,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	52,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	53,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	54,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	55,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	56,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	57,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	58,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	59,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	60,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	61,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	62,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	63,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	64,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	65,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	66,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	67,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	68,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	69,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	70,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	71,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	72,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	73,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	74,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	75,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	76,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	77,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	78,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	79,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	80,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	81,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	82,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	83,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	84,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	85,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	86,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	87,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	88,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	89,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	90,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	91,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	92,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	93,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	94,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	95,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	Ross
Overland, Exp.	23	96,000	36x5	Cont.	4-4 1/2x5 1/2	Besch.	Wauk.	Pierce	Strom.	H-Shaw	Cotta.	Timkn.	

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Motor Age Monthly Guide to Tractors

Line No.	Manufacturer	Tractor	Drawbar horsepower	Belt horsepower	No. plows recommended	Size separator recommended	Pounds pull drawbar	Weight	Price	Traction	Diameter drive wheels	Make of engine	Cylinders
1	Acme Harvesting Machine Co., Peoria, Ill.	Acme.....	12	25	3		2600	6000	\$1,800	2 Wh.	54	Beav.	4 Ver.
2		Acme.....	12	25	3		2600	6800	2,250	2 Cr.		Beav.	4 Ver.
3	Adams Co., Maryville, Ohio.	Adams.....	9	13	1-2			5500	850	2 Wh.	36	Herc.	1 Hor.
4		Oil Pull.....	12	20	3	22 x 36	2150			2 Wh.	51	Own	2 Hor.
5	Advance-Rumely Co., Laporte, Ind.	Oil Pull.....	16	30	4	28 x 44	2850			2 Wh.	56	Own	2 Hor.
6		Oil Pull.....	20	40	5-6	32 x 52	3750			2 Wh.	64	Own	2 Hor.
7		Oil Pull.....	30	60	8-10	36 x 60	5900			2 Wh.	80	Own	2 Hor.
8	Allis-Chalmers Mfg. Co., Milwaukee, Wis.	Allis-Chalmers.....	10	18	2		1800	4800	1,250	2 Wh.	56	Own	2 Opp.
9	Andrews Tractor Co., Minneapolis, Minn.	Andrews.....	12	20			1900	5250	1,000	2 Wh.	48	Veer.	4 Opp.
10	Appleton Mfg. Co., Batavia, Ill.	Appleton.....	12	20		24	2200	4900		2 Wh.	54	Buda	4 Ver.
11		Aultman-Taylor.....	15	30			3300	7800		2 Wh.	70	Wauk.	4 Ver.
12	Aultman-Taylor Machinery Co., Mansfield, Ohio.	Aultman-Taylor.....	18	36	4-6	30 x 46	4000	12500		2 Wh.	70	Own	4 Opp.
13		Aultman-Taylor.....	25	50	6-8	36 x 56	5500	18700		2 Wh.	78	Own	4 Opp.
14		Aultman-Taylor.....	30	60	8-12	42 x 64	8000	23000		2 Wh.	90	Own	4 Opp.
15		Multipedal.....	5	10			750	950		2Wor2C		Le Roi	4 Ver.
16		Multipedal.....	12	20			2000	3500		2 Cr.		Buff.	4 Ver.
17	F. C. Austin Co., Inc., Chicago, Ill.	Multipedal.....	15	30			2400	4500		2Wor2C		Asso.	4 Ver.
18		Multipedal.....	20	40	4		3200	10250		2 Cr.		Auto.	4 Ver.
19		Multipedal.....	25	50			4200	12500		2 Cr.		Buff.	4 Ver.
20		Multipedal.....	75	125			12500	24000		2 Cr.		Buff.	4 Ver.
21		Avery.....	5	10		Small		2150		2 Wh.	30	Own	4 Ver.
22		Avery.....	8	16	3	19 x 30		4900		2 Wh.	50	Own	2 Opp.
23	Avery Co., Peoria, Ill.	Avery.....	12	25	4	22 x 36		7500		2 Wh.	56	Own	2 Opp.
24		Avery.....	18	36	4	28 x 46		9250		2 Wh.	65	Own	4 Opp.
25		Avery.....	25	50	6	32 x 54		12500		2 Wh.	69	Own	4 Opp.
26		Avery.....	40	80	8-10	42 x 70		22000		2 Wh.	87½	Own	4 Opp.
27	Bean Spray Pump Co., San Jose, Cal.	Track Pull.....	6	10	2		1125	3200	1,340	1 Cr.		Le Roi	4 Ver.
28	Beeman Garden Tractor Co., Minneapolis, Minn.	Beeman.....	11	4					285	2 Wh.	25	Own	4 Ver.
29	Beltrail Tractor Co., St. Paul, Minn.	Beltrail.....	12	20	2		2000	4500	1,600	1 Cr.		Wauk.	4 Ver.
30	C. L. Best Gas Tractor Co., San Leandro, Cal.	Best Tracklayer.....	20	40				11000	4,100	2 Cr.		Own	4 Ver.
31		Best Tracklayer.....	38	75				28000	5,750	2 Cr.		Own	4 Ver.
32	Blumberg Mfg. Co., San Antonio, Tex.	Blumberg.....	9	18				2450	850	2 Wh.	40	Own	4 Ver.
33		Blumberg.....	12	24				3400	1,250	2 Wh.	40	Own	4 Ver.
34	Boring Tractor Corp., Rockford, Ill.	Boring.....		20				3550	1,485	2 Wh.	54	Wauk.	4 Ver.
35	Brillion Iron Works, Brillion, Wis.	Brillion.....	12	22	3	26	3000	4900		2 Wh.	60	Field	4 Opp.
36	Buckeye Mfg. Co., Anderson, Ind.	Trundaar.....	20	35	4		4000	9200		2 Cr.		Wauk.	4 Ver.
37	Buckeye Traction Ditcher Co., Findlay, Ohio.	Buckeye 40.....	16	30				21000	5,500	2 Cr.		Auto.	4 Ver.
38		Buckeye 60.....	24	45				25000	6,500	2 Cr.		Auto.	4 Ver.
39		Creeping Grip.....	15	25			3000	7000	2,000	2 Cr.		Wauk.	4 Ver.
40	Bullock Tractor Co., Chicago, Ill.	Senior.....	35	50			6000	18000	4,500	2 Cr.		Wauk.	4 Ver.
41		Giant.....	50	75			7500	20000	5,000	2 Cr.		Wauk.	4 Ver.
42		Case.....	10	18	2-3	20 x 28	2080	3400	1,225	2 Wh.	42	Own	4 Ver.
43	J. I. Case T. M. Co., Racine, Wis.	Case.....	10	20	3	20 x 36	2330	5050	1,325	2 Wh.	52	Own	4 Ver.
44		Case.....	15	27	3-4	26 x 46	3000	5600	1,600	2 Wh.	52	Own	4 Ver.
45		Case.....	20	40	5-6	32 x 54	4400	14050	3,000	2 Wh.	66	Own	2 Opp.
46	Chase Motor Truck Co., Syracuse, N. Y.	Chase.....	9	18				4700	1,200	2 Wh.	48	Buda	4 Ver.
47	Cleveland Tractor Co., Cleveland, Ohio.	Cleveland.....	12	20	2		1500	3200	1,586	2 Cr.		Weid.	4 Ver.
48	C. O. D. Tractor Co., Minneapolis, Minn.	C. O. D.....	13	25	3		2500	6500	1,395	2 Wh.	70	Own	2 Hor.
49	Coleman Tractor Co., Kansas City, Mo.	Coleman.....	16	30			2000		1,750	2 Wh.	44	Clim.	4 Ver.
50	Columbus Tractor Co., Columbus, Ohio.	Farmer Boy.....	10	20			1750	3600	1,350	1 Wh.	50	Wauk.	4 Ver.
51	Dart Truck & Tractor Corp., Waterloo, Iowa.	Blue J.....	15	30	3	24	3000	4500	1,750	1 Wh.	40	Buda	4 Ver.
52	Dauch Mfg. Co., Sandusky, Ohio.	Sandusky J.....	10	20	2-3	24	2000	4080	1,500	2 Wh.	48	Own	4 Ver.
53		Sandusky E.....	15	35	4	32	3000	8000	2,500	2 Wh.	56	Own	4 Ver.
54	Dayton-Dick Co., Quincy, Ill.	Leader B.....	12	18	2-3	24	2500	4800	1,000	2 Wh.	48	Own	2 Opp.
55		Leader C.....	18	36	4-6	32	4000	6600	2,250	2 Cr.		Twin	4 Ver.
56	G. I. Dill Mfg. Co., Harrisburg, Ark.	Dill.....	20				6000	4400	2,480	2 Wh.	42	Cont.	4 Ver.
57		Capital 20.....	20					12000	3,000	2 Wh.	53	Own	2 Opp.
58	C. H. A. Dissinger & Bro. Co., Wrightsville, Pa.	Capital 30.....	30					14000	4,000	2 Wh.	60	Own	2 Opp.
59		Capital 45.....	45					16000	4,400	2 Wh.	66	Own	2 Opp.
60		Capital 75.....	75					24000	6,000	2 Wh.	84	Own	2 Opp.
61	Eagle Mfg. Co., Appleton, Wis.	Eagle F.....	12	16	3	26	2400	5900	1,522	2 Wh.	48	Own	2 Hor.
62		Eagle.....	22	30	4	32	3700	7050	1,853	2 Wh.	52	Own	2 Hor.
63	Electric Wheel Co., Quincy, Ill.	Allwork.....	14	28	3	28	3000	5000	1,460	2 Wh.	48	Own	4 Ver.
64	Elgin Tractor Corp., Piqua, Ohio.	Elgin B.....	9	18			1600	2900	1,075	2 Wh.	42	Buda	4 Ver.
65		Elgin E.....	10	20	3	20	2000	3300	1,385	2 Wh.	42	Ruten.	4 Ver.
66		E-B 12-20 AA.....	12	20	3	24	2500	4355		2 Wh.	54	Own	4 Ver.
67		E-B 9-16.....	9	16	2	18	1500	4260		2 Wh.	54	Own	4 Ver.
68	Emerson-Brantingham Co., Rockford, Ill.	E-B 12-20.....	12	20	3	24	2000	6500		2 Wh.	60	Own	4 Ver.
69		E-B 20-35.....	20	35	4-6	30	3000	9700		2 Wh.	72	Own	4 Ver.
70		E-B 40-65.....	40	65	8-10	44	10000	23000		2 Wh.	90	Own	4 Ver.
71	Evans Mfg. Co., Hudson, Ohio.	Evans K.....	20	35			3500	5500	2,000	2 Wh.	60	Buda	4 Ver.
72	Fagool Motors Co., Oakland, Cal.	Fagool.....	18	18	2		1000	3000	1,500	2 Wh.	48	Over.	4 Ver.
73	Farm Horse Traction Works, Hartford, S. D.	Farm Horse.....	16	34	3	28		4950	1,485	2 Wh.	48	Clim.	4 Ver.
74		Farquhar.....	15	25	3-4	27	2500	6000		2 Wh.	54	Buda	4 Ver.
75	A. B. Farquhar Co., Ltd., York, Pa.	Farquhar.....	18	35	4-5	30	3600	16000		2 Wh.	84	Own	4 Ver.
76		Farquhar.....	25	50	6-7	33	5000	19000		2 Wh.	84	Own	4 Ver.

Abbreviations: **Traction**—Wh., wheel; Cr., crawler. **Engine**—Beav., Beaver; Veer., Veerac; Herc., Hercules; Wauk., Waukesha; Buff., Buffalo; Asso., Associated Manufacturers; horizontal; Opp., opposed. **Fuel**—G., gasoline; K., kerosene; D., distillate. **Carburetor**—Ray., Rayfield; King., Kingston; Holl., Holley; Scheb., Schebler; Ben., Bennett; Web., Holl., Holley. **Magneto**—A-K, Atwater Kent; Sum., Sumter; Eise., Eisemann; Berl., Berling. **Clutch**—B. & B., Borg & Beck; Bier., Bierman; Mun., Muncie; Rock., Rockwood; jaw clutch. **Final drive**—S. G., spur gear; G., gear; Ch., chain. **Drive**—Op., open; In., inclosed.

and Their Technical Specifications

Line No.	Bore and stroke	Normal R. P. M.	Fuel	Make and size of carburetor	Make of air cleaner	Make of magnet	Make of clutch	Make of gearset	Gearset type	Belt pulley diameter	Belt pulley R. P. M.	Belt speed F. P. M.	Speeds forward	Speed range, M. P. H.	Recommended plowing speed	Final drive	Drive	Furrow wheel	Line No.
1	4 1/2 x 6	850	G-K	1 1/2-King.	.....	K-W	Own	.....	Sl. G.	14	900	3300	2	2 1/4-3 1/2	2 1/2	S. G.	Op.	.....	1
2	4 1/2 x 6	850	G-K	1 1/2-King.	.....	K-W	Own	.....	Sl. G.	14	900	3300	2	2 1/4-3 1/2	2 1/2	S. G.	Op.	.....	2
3	.....	375	G-K	.....	.....	Web.	Own	.....	Ch.	14-18	950	.....	1	.....	2 1/4	Ch.	Op.	.....	3
4	6 x 8	570	K-D	2 1/4-Own	Donal.	Bosch	Own	.....	.....	19	560	2790	2	2.1-3.26	2.1	S. G.	In.	No	4
5	7 x 8 1/2	530	K-D	2 1/4-Own	Donal.	Bosch	Own	Own	Sel. G.	23	530	3190	2	2.1-3	2.1	S. G.	In.	No	5
6	8 x 10	450	K-D	3 1/4-Own	Donal.	Bosch	Own	Own	Sel. G.	26	450	3060	2	2-3.2	2	S. G.	In.	No	6
7	10 x 12	375	K-D	3 1/4-Own	.....	Bosch	Own	.....	.....	36	375	3540	1	1.9	1.9	S. G.	Op.	No	7
8	5 1/2 x 7	720	G-K	1 1/2-King.	Ben.	K-W	Own	Own	.....	14 1/2	720	2750	1	.....	2 1/4	S. G.	Op.	Yes	8
9	4 x 5	1000	G	1 1/4-Krice	.....	Bosch	Own	.....	Fr.	12	890	2500	3	.....	2 1/4	Ch.	Op.	Yes	9
10	4 1/2 x 5 1/2	1050	G-K	1 1/4-Scheb.	Ben.	Bosch	B. & B.	.....	Sl. G.	12	825	2600	2	2-3 1/2	.....	G.	Op.	Yes	10
11	4 1/2 x 6 1/4	900	G-K	.....	.....	Bosch	Own	Own	S. G.	20	450	2250	1	2.25	.....	S. G.	Op.	Yes	11
12	5 x 8	600	G-K	1 1/4-King.	.....	Bosch	Own	Own	S. G.	20	600	3100	2	2.13-2.93	2.93	S. G.	Op.	No	12
13	6 x 9	500	G-K	2 -King.	.....	Bosch	Own	Own	S. G.	24	500	3100	1	2.28	2.28	S. G.	Op.	No	13
14	7 x 9	500	G-K	2 1/2-King.	.....	Bosch	Own	Own	S. G.	24	500	3100	1	2.2	2.2	S. G.	Op.	No	14
15	2 1/2 x 4 1/2	1000	G-K	.....	Orem	K-W	Own	.....	.....	6	1440	2600	1	2 1/2	.....	.....	.....	Yes	15
16	4 x 5	1000	G-K	.....	Orem	K-W	Own	.....	.....	8	1300	2600	2	2 1/2-3 1/2	.....	.....	.....	No	16
17	4 1/2 x 6	900	G-K	.....	Orem	K-W	Own	.....	.....	9 1/2	965	2600	2	1 1/2-3 1/2	.....	.....	.....	No	17
18	5 x 7	800	G-K	1 1/2-Ben.	Orem	K-W	Own	Own	Sel. G.	20	500	2600	2	1 1/2-3	2	G.	Op.	No	18
19	6 x 7 1/2	750	G-K	.....	Orem	K-W	Own	.....	.....	20	500	2600	2	1 1/2-3	.....	.....	.....	No	19
20	7 1/2 x 9	550	G-K	.....	Orem	K-W	Own	.....	.....	20	500	2600	2	1 1/2-3 1/2	.....	.....	.....	No	20
21	3 x 4	1200	G-K	3/4-Zeph.	Ben.	A-K	Own	Own	Sl. Fr.	9	1000	2360	4	1-3	1 1/2	S. G.	Op.	No	21
22	5 1/2 x 6	600	G-K	1 1/4-King.	Ben.	K-W	Own	Own	Sl. G.	18	600	2830	2	1 1/4-3	1 1/4	S. G.	Op.	No	22
23	6 1/2 x 7	570	G-K	1 1/2-King.	Ben.	K-W	Own	Own	Sl. G.	19 1/2	570	2880	2	1 1/4-2 1/4	1 1/4	S. G.	Op.	No	23
24	5 1/2 x 6	650	G-K	1 1/2-King.	Ben.	K-W	Own	Own	Sl. G.	18	650	3000	2	2-3	2	S. G.	Op.	No	24
25	6 1/2 x 7	500	G-K	2 -King.	Ben.	K-W	Own	Own	Sl. G.	22	500	2880	2	2-3	2	S. G.	Op.	No	25
26	7 1/2 x 8	500	G-K	2 -King.	Ben.	K-W	Own	Own	Sl. G.	26	500	3400	2	1 1/2-2 1/2	2	S. G.	Op.	No	26
27	3 1/2 x 4 1/2	1200	D	1 -Mayer	Donal.	Bosch	Own	Own	S. G.	12	600	1900	2	1 1/2-2 1/2	1	G.	In.	.....	27
28	3 1/2 x 4 1/2	500	G	3/4-King.	Donal.	Heinze	Own	.....	.....	4 1/2	230	1500	1	3/4-3	3/4-2 1/2	.....	In.	.....	28
29	3 1/2 x 5 1/4	1000	G-D	1 -King.	Ben.	Dixie	Own	.....	Sl. G.	10	1000	2500	2	2 1/2-3 1/2	2 1/2	S. G.	Op.	Yes	29
30	6 1/4 x 6 1/4	600	D	1 1/2-Ens.	Ben.	Dixie	Own	Own	Sl. G.	.....	.....	.....	3	.....	2 1/2	G.	In.	.....	30
31	7 1/2 x 9	435	D	2 -Ens.	Ben.	Dixie	Own	Own	Sl. G.	.....	.....	.....	3	.....	2 1/2	G.	In.	.....	31
32	3 1/2 x 3 1/4	750	G	.....	Holl.	Dixie	.....	Foote	Sl. G.	10	600	1550	2	1-4	3	G.	In.	Yes	32
33	3 3/8 x 5	750	G	1 1/4-Strom.	Holl.	Dixie	.....	Foote	Sl. G.	16	600	2480	2	1-4	3	G.	In.	Yes	33
34	4 1/4 x 5 1/4	1000	G-K	1 1/4-King.	Ben.	King.	.....	.....	Sl. G.	10	435	1140	2	1-5	.....	Ch.	Op.	Yes	34
35	3 1/2 x 5	1000	K	1 1/4-King.	Own	Dixie	Bier.	Foote	Sl. G.	8	1000	2100	3	2-5	2	G.	Op.	No	35
36	4 1/2 x 6 1/4	950	G-K-D	1 1/2-Deppe	.....	Bosch	Own	Own	S. G.	10	950	2650	2	3.1-8	2 1/2	S. G.	In.	.....	36
37	6 1/2 x 8	500	G-K	1 1/2-Ben.	Ben.	K-W	Own	Own	G.	14	250	1000	4	3.1-8	.....	Ch.	Op.	.....	37
38	7 1/2 x 9	500	G-K	2 -Ben.	Ben.	K-W	Own	Own	G.	14	222	870	1	2 1/2	.....	Ch.	Op.	.....	38
39	4 1/2 x 6 1/4	900	G-K	1 1/4-Ben.	Ben.	Dixie	B. & B.	Own	Sl. G.	12	600	1875	3	1 1/4-3 1/2	2 1/4	.....	.....	No	39
40	5 1/2 x 7 1/2	850	G-K	.....	Ben.	Dixie	B. & B.	Own	Sl. G.	15	600	2250	3	1 1/4-3 1/2	.....	.....	.....	No	40
41	7 1/2 x 9 1/2	.....	G-K	.....	Ben.	Dixie	B. & B.	Own	Sl. G.	14	60	220	2	2 1/4-3 1/2	.....	.....	.....	No	41
42	3 1/2 x 5	1050	K	1 1/2-King.	Own	King.	Own	Own	Sl. G.	14 1/4	1050	3900	2	2 1/4-3 1/2	2 1/4	S. G.	In.	.....	42
43	4 1/2 x 6	900	K	1 1/4-King.	Own	King.	Own	Own	Sl. G.	17	900	4000	1	2 1/4	2 1/4	S. G.	Op.	No	43
44	4 1/2 x 6	900	K	King.	Own	King.	Own	Own	Sl. G.	16	900	3762	2	2-3 1/2	2 1/4-3 1/2	S. G.	Op.	No	44
45	8 1/2 x 9	475	K	2 1/2-King.	.....	K-W	Own	Own	Sl. G.	24	475	2980	2	2-3	2	S. G.	Op.	No	45
46	2 1/2 x 5 1/2	900	G	1 1/4-Holl.	.....	King.	Bier.	Own	Sl. G.	8	900	1885	2	1 1/2-2 1/2	1 1/2	G.	Op.	No	46
47	3 1/2 x 5 1/2	1200	G-K	1 1/2-King.	Own	Eise	Own	B. & S.	S. G.	8	1200	2500	2	1 1/2-2 1/2	3 1/2	G.	In.	No	47
48	6 1/2 x 7	550	K	1 1/2-King.	.....	K-W	Own	.....	S. G.	18	530	2500	3	.....	.....	S. G.	In.	Yes	48
49	5 x 6 1/2	800	G-K	1 1/4-Strom.	Ben.	Dixie	B. & B.	.....	.....	12	800	2100	2	1 1/4-4	3	Worm	In.	Yes	49
50	3 1/2 x 5 1/4	1000	K	1 1/4-King.	.....	K-W	B. & B.	.....	G.	12	1000	3140	2	2 1/4-3	2 1/2	S. G.	Op.	Yes	50
51	4 1/4 x 5 1/2	1050	G	1 1/4 Zen.	Ben.	Dixie	Fuller	Own	Sl. G.	12	750	2355	3	1 1/4-6	2 1/2	.....	In.	No	51
52	4 1/2 x 5 1/4	985	G-K	1 1/4-King.	Ben.	Dixie	Own	Own	Sel. G.	10	975	2577	3	2-5	2-3	S. G.	Op.	Yes	52
53	5 x 6 1/2	750	G-K	2 -King.	Ben.	Dixie	Own	Own	Sel. G.	15	750	2945	2	2 1/4-3 1/2	3-4 1/2	S. G.	Op.	No	53
54	6 1/4 x 6	750	K	1 1/2-King.	Own	King.	Own	Own	Sel. G.	14	750	2750	2	1.8-3	1.8	G.	Op.	Yes	54
55	5 x 7 1/2	700	K	1 1/4-King.	Ben.	K-W	Own	Own	Sel. G.	14	700	2600	3	.....	1.8	Ch.	Op.	No	55
56	4 1/2 x 5 1/2	900	G	1 1/2-Scheb.	Donal.	Bosch	B. & B.	Cotta	G.	.....	.....	.....	.....	.....	.....	Ch.	Op.	No	56
57	8 1/2 x 12	300	.....	.....	.....	.....	.....	.....	.....	36	300	.....	.....	.....	.....	.....	.....	.....	57
58	9 x 14	300	.....	.....	.....	.....	.....	.....	.....	36	300	.....	.....	.....	.....	.....	.....	.....	58
59	10 1/2 x 15	250	.....	.....	.....	.....	.....	.....	.....	40	250	.....	.....	.....	.....	.....	.....	.....	59
60	12 x 16	250	.....	.....	.....	.....	.....	.....	.....	40	250	.....	.....	.....	.....	.....	.....	.....	60
61	7 x 8	425	K	1 1/2-Linga.	.....	Dixie	Own	Own	Sl. G.	20	450	2250	2	2-3	2	G.	In.	Yes	61
62	8 x 8	425	K	2 -Linga.	.....	Dixie	Own	Own	Sl. G.	24	450	2678	2	2-3	2	G.	In.	Yes	62
63	5 x 6	800	K	1 1/2-King.	Ben.	King.	Own	Own	Sl. G.	12	800	2514	2	1 1/4-2.4	2.4	S. G.	In.	Yes	63
64	3 1/2 x 5 1/2	1000	G	.....	Own	King.	Own	.....	Fr.	9	1000	2360	7	.....	3 1/2	Ch.	In.	Yes	64
65	4 1/2 x 5 1/2	1000	G-K	.....	Own	King.	Own	.....	Fr.	10	1000	2600	1	.....	3 1/2	Ch.	In.	Yes	65
66	4 1/2 x 5	900	K	.....	Ben.	K-W	Own	.....	Sl. G.	12	900	2800	2	1.81-2.33	.....	G.	In.	No	66
67	4 1/2 x 4 1/2	800	K	1 1/4-Ben.	Ben.	K-W	Own	.....	Sl. G.	12	800	2500	2	1.72-2.33	.....	G.	In.	No	67
68	4 1/2 x 5	850	K	1 1/2-Ben.	Ben.	K-W	Own	.....	Sl. G.	12	708	2225	3	1.6-3.4	.....	G.	In.	Yes	68
69	5 x 7	700	K	1 1/2-Ben.	Ben.	K-W	Own	.....	Sl. G.	16	597	2500	2	1.7-2.26	.....	G.	In.	No	69
70	7 1/2 x 9	500	K	2 1/2-Ben.	Ben.	K-W	Own	.....	Sl. G.	22	500	2880	1	2	2	G.	In.	No	70
71	4 1/2 x 6	950	.....	1 1/2-Ray.	.....	Bosch	B. & B.	Own	Sel. G.	24	425	2650	2	2 1/2-5	2 1/2	G.	In.	Yes	71
72	3 3/8 x 5	1100	G-D	.....	Till.	Own	Berl.	Own	G.	6	.....	.....	2	2 1/2-2 1/2	2 1/2	G.	Op.	Yes	72
73	5 x 6 1/2	800	K	1 1/2-King.	Ben.	Dixie	Bier.	Own	Sl. G.	14	800	.....	2	1-4	3	Ch.	In.	No	73
74	4 1/2 x 6	900	G-K	1 1/2-King.	Ben.	K-W	Own	Nutt.	Sel. G.	14	800	2000	2	1-4	.....	G.	In.	.....	74
75	6 x 8	550	G-K	2 -King.	.....	K-W	Own	.....	.....	32	275	2300	2	1-2.3	.....	G.	Op.	.....	75
76	7 x 8	550	G-K	2 -King.	.....	K-W	Own	.....	.....	32	275	2300	2	1-2.3	.....	G.	Op.	.....	76

Auto., Automatic; Weid., Weidely; Clim., Climax; Twin, Twin City; Cont., Continental; Ruten., Rutenber; Over., Overland; Kenn., Kenneth. **Cylinders**—Ver., vertical; Hor., Webster; Zeph., Zephyr; Ens., Ensign; Strom., Stromberg; Till., Tillotson; Zen., Zenith; Car., Carter; Perr., Perrin-Ingram. **Air Cleaner**—Donal., Donaldson; Ben., Bennett; Spec., special. **Gearset**—B. & S., Brown & Sharpe; Nutt., Nuttall. **Gearset type**—Sl. G., sliding gear; Sel. G., selective gear; Fr., friction; Plan., planetary; Sl. J. C., sliding

Motor Age Monthly Guide to Tractors and

Line No.	Manufacturer	Tractor	Drawbar horsepower	Belt horsepower	No. plows recommended	Size separator recommended	Pounds pull drawbar	Weight	Price	Traction	Diameter drive wheels	Make of Engine	Cylinders
77	Henry Ford & Son, Inc., Dearborn, Mich.	Fordson	12	20	2		1800	2700		2 Wh.	42	Own	4 Ver.
78	Four Drive Tractor Co., Big Rapids, Mich.	Fitch	15	26	3	28	2200	5900	\$2,500	2 Wh.	42	Beav.	4 Ver.
79	Frick Co., Waynesboro, Pa.	Frick	12	25	3	27	3000	5800		2 Wh.	60	Erd	4 Ver.
80	Fulton Tractor Co., Anderson, Ind.	Fulton	10		2			2500	1,275	2 Wh.	56	Wauk.	4 Ver.
81	Gile Engine & Tractor Co., Ludington, Mich.	Gile Q.	18		4-5	36	3500	7000		2 Wh.	60	Own	4 Ver.
82	Gray Tractor Co., Minneapolis, Minn.	Gray	18	36	4	30	3750	6200	2,250	Drum	54	Wauk.	4 Ver.
83	Hart-Parr Co., Charles City, Iowa	New Hart-Parr	15	31	3	28	3000	5300	1,395	2 Wh.	52	Own	2 Hor.
84	Hession Tiller & Tractor Corp., Buffalo, N. Y.	Hession	13	25			3000	4200	1,675	2 Wh.	48	Erd	4 Ver.
85	Hollis Tractor Co., Pittsburgh, Pa.	Hollis	15	25	3		3000	2750	1,375	2 Wh.	30	Light	4 Ver.
86		Caterpillar	25	45			5000	13600		2 Cr.		Own	4 Ver.
87	Holt Mfg. Co., Peoria, Ill.	Caterpillar	40	75			9300	25000		2 Cr.		Own	4 Ver.
88		Caterpillar	70	120			15500	26500		2 Cr.		Own	6 Ver.
89	Huber Mfg. Co., Marion, Ohio	Huber Light Four	12	25	3	22	2300	5000	1,285	2 Wh.	60	Wauk.	4 Ver.
90	Illinois Tractor Co., Bloomington, Ill.	C.	18	36	4	32		5000	2,150	2 Wh.	54	Clim.	4 Ver.
91	Imperial Machine Co., Minneapolis, Minn.	Imperial	49	70			7500	20800	4,500	2 Wh.	96	Own	4 Opp.
92		Titan	10	20	3	24	1800	5700	1,225	2 Wh.	54	Own	2 Hor.
93	International Harvester Co., Chicago	Mogul	10	20	3	24	1800	5500	1,125	2 Wh.	54	Own	1 Hor.
94		International	15	30	4	28	2350	9000		2 Wh.	66	Own	4 Ver.
95	Interstate Tractor Co., Waterloo, Iowa	Plowman	13	30	3		2800	4400		2 Wh.	60	Buda	4 Ver.
96		Plowman	15	30	3		3200	4800		2 Wh.	60	Buda	4 Ver.
97	Joliet Oil Tractor Co., Joliet, Ill.	Bates Steel Mule	12	20	3	28		4300		2 Cr.		Erd	4 Ver.
98	Kansas City Hay Press Co., Kansas City, Mo.	Prairie Dog	9	18	2		1500	3000	1,150	1 Wh.	48	Wauk.	4 Ver.
99	Keck-Gonnerman Co., Mount Vernon, Ind.	Keck-Gonnerman	12	24	3	24		6500	1,500	2 Wh.	61	Own	2 Hor.
100		Flour City Jr.	14	24	3			6800		2 Wh.	60	Own	4 Ver.
101	Kinnard & Sons Mfg. Co., Minneapolis, Minn.	Flour City	20	35	4-6			10000		2 Wh.	72	Own	4 Ver.
102		Flour City	30	50	6-8			14000		2 Wh.	84	Own	4 Ver.
103		Flour City	40	70	8-10			21000		2 Wh.	96	Own	4 Ver.
104	La Crosse Tractor Co., La Crosse, Wis.	Happy Farmer, F	12	24	3	24	2000	3800	1,150	2 Wh.	56	Own	2 Hor.
105		G.	12	24	3	24	2000	3800	1,250	2 Wh.	56	Own	2 Hor.
106	Lang Tractor Co., Minneapolis, Minn.	Lang	15	30			3000	4500	1,485	2 Wh.	50	Clim.	4 Ver.
107	Lauson, John, Mfg. Co., New Holstein, Wis.	Lauson	15	25	3-4	28	4000	5000	1,895	2 Wh.	54	Beav.	4 Ver.
108	Leonard Tractor Co., Jackson, Mich.	Leonard	20	30	4	28	4000	5000	2,000	2 Wh.	50	Buda	4 Ver.
109	Lombard Auto Tractor Truck Corp., New York	Lombard					1900			2 Cr.		Own	6 Ver.
110	Liberty Tractor Co., Minneapolis, Minn.	Liberty	15	30				5775		4 Wh.	48	Clim	4 Ver.
111	Little Giant Co., Mankato, Minn.	Little Giant B.	16	22	3-4	26		5200	1,650	2 Wh.	54	Own	4 Opp.
112		Little Giant A.	26	35	5-6	32		8700	2,500	2 Wh.	66	Own	4 Opp.
113	Madison Motors Co., Anderson, Ind.	Bull	12	24	2-3	26	1900	5000	1,075	1 Wh.	72	Toro.	2 Opp.
114	Midwest Engine Co., Indianapolis, Ind.	Atlas	16	26			2800	5100	1,150	2 Wh.	66	Wauk.	4 Ver.
115		Twin City 12	12	20	3	20	2000	4000		4 Wh.	50	Own	4 Ver.
116		Twin City 16	16	30	4	24	3000	7800		2 Wh.	54	Own	4 Ver.
117	Minneapolis Steel & Machinery Co., Minneapolis, Minn.	Twin City 25	25	45	6	32	4700	16000		2 Wh.	76	Own	4 Ver.
118		Twin City 40	40	65	8-10	36	7500	23700		2 Wh.	84	Own	4 Ver.
119		Twin City 60	60	90	12-15		11250	28000		2 Wh.	84	Own	6 Ver.
120	Moline Plow Co., Moline, Ill.	Moline Universal D	9	18	2		2000	3300	1,500	2 Wh.	52	Own	4 Ver.
121		Lightfoot	6	10	1-2		1100	3200	1,250	2 Cr.		Kenn.	4 Ver.
122	Monarch Tractor Co., Watertown, Wis.	Neverslip M.	12	20	3	24	2200	6200	1,850	2 Cr.		Erd	4 Opp.
123		Neverslip N.	18	30	4	28	3300	7400	2,250	2 Cr.		Doman	4 Ver.
124	National Tractor Co., Cedar Rapids, Iowa	National E.	9	16	2	22	1800	3800	1,075	2 Wh.	46	Wauk.	4 Ver.
125		National F.	16	22	3	26	2250	4200	1,375	2 Wh.	46	Wauk.	4 Ver.
126	Nilson Tractor Co., Minneapolis, Minn.	Nilson Junior	16	25	3-4	24	3000	5900	1,775	2 Wh.	50	Wauk.	4 Ver.
127		Nilson Senior	24	36	4-5	30	4000	6400	2,475	2 Wh.	52	Wauk.	4 Ver.
128	Ohio Mfg. Co., Upper Sandusky, Ohio	Whitney	9	18	2	20	1600	3000	1,050	2 Wh.	48	Gile	2 Opp.
129	Parrett Tractor Co., Chicago	Parrett F.	12	25	3	24	2600	5200		2 Wh.	60	Buda	4 Ver.
130		Parrett H.	12	25	3	24	2600	5350		2 Wh.	60	Buda	4 Ver.
131	Pioneer Tractor Co., Winona, Minn.	F.	15	30	4	28		8500		2 Wh.	60	Own	4 Opp.
132		C.	30	60	10	36		23500		2 Wh.	96	Own	4 Opp.
133	Port Huron Engine & Thresher Co., Port Huron, Mich.	Port Huron	12	25	3	22	2200	5700	1,500	2 Wh.	56	Erd	4 Ver.
134	Rock Island Plow Co., Rock Island, Ill.	Heider D.	9	16	2	18	1500	4000	1,070	2 Wh.	54	Wauk.	4 Ver.
135		Heider C.	12	20	3	24	2000	6000	1,395	2 Wh.	57	Wauk.	4 Ver.
136	Royer Ensilage Harvester Co., Wichita, Kan.	Royer	12	25			2200	4600	1,225	2 Wh.	54	Erd	4 Ver.
137		Junior	12	24	2	18	2000	6200		2 Wh.	53	Wauk.	4 Ver.
138	Russell & Co., The, Massillon, Ohio	Little Boss	15	30	3	24	3000	6900		2 Wh.	53	Wauk.	4 Ver.
139		Big Boss	20	40	4	30	4000	7600		2 Wh.	60	Model	4 Ver.
140		Giant	30	60	8	40	8000	24000		2 Wh.	84	Own	4 Ver.
141	Short Turn Tractor Co., Bemidji, Minn.	Short Turn	30		3		5000		1,550	2 Wh.	51	Erd	4 Ver.
142	Square Turn Tractor Co., Norfolk, Neb.	Square Turn	18	35			3200	7800	1,875	2 Wh.	61	Clim.	4 Ver.
143	Star Tractor Co., Findley, Ohio	Indiana	5	10			1000	1700	900	2 Wh.	50	Le Roi	4 Ver.
144	Stinson Tractor Co., Minneapolis, Minn.	Stinson	18	36	4	32	4750	6550		4 Wh.	60	Beav.	4 Ver.
145	Topp-Stewart Tractor Co., Clintonville, Wis.	B.	20	35	4-6	30	4500	6500	2,750	4 Wh.	42	Wauk.	4 Ver.
146	Turner Mfg. Co., Port Washington, Wis.	Turner-Simplicity	12	20	2-3	24	2300	4000	1,395	2 Wh.	54	Wauk.	4 Ver.
147		Turner-Simplicity	14	25	3-4	28	2600	4400	1,675	2 Wh.	54	Buda	4 Ver.
148	U. S. Tractor Co., Minneapolis, Minn.	U. S. B.	12	22			2000	3900	975	2 Wh.	60	Gile	2 Opp.
149		U. S. C.	18	30			3000	4100	1,450	2 Wh.	60	Erd	4 Ver.
150	Wallis Tractor Co., Racine, Wis.	Cub Junior	15	25	2-3	24	2000	3250	1,600	2 Wh.	48	Own	4 Ver.
151	Waterloo Gasoline Engine Co., Waterloo, Iowa	Waterloo Boy	12	25	3	24	2000	6000		2 Wh.	52	Own	2 Hor.
152	Wichita Tractor Co., Wichita, Kan.	A.	8	16	2-3		1500	3500	1,025	2 Wh.	60	Gile	2 Opp.
153	Wisconsin Farm Tractor Co., Sauk City, Wis.	E.	16	32	3-4	28	3500	5240	2,250	2 Wh.	52	Clim.	4 Ver.
154	World Harvester Corp., New York	Auto Tiller	8	16			750	850	365	2 Wh.	36	Own	1 Hor.
155	Zelle Tractor Co., St. Louis, Mo.	Zelle	12	25	2-3	24	2000	3800	2,000	2 Wh.	54		4 Ver.

Abbreviations: Traction—Wh., wheel; Cr., crawler. Engine—Beav., Beaver; Veer., Veerac; Wauk., Waukesha; Buff., Buffalo; Asso., Associated Manufacturers; Auto., Auto Opp., opposed. Fuel—G., gasoline; K., kerosene; D., distillate. Carburetor—Ray., Rayfield; King., Kingston; Holl., Holley; Scheb., Schebler; Ben., Bennett; Zeph., Zephyr; Ens., Atwater Kent; Sum., Sumter; Eise., Eiseemann; Berl., Berling. Clutch—B. & B., Borg & Beck; Bier., Bierman; Mun., Muncie; Rock., Rockwood; Spec., special. Gearset—B. & spur gear; G., gear; Ch., chain; R. P., roller pinion. Drive—Op., open; In., inclosed.

Their Technical Specifications—Concluded

Line No.	Bore and stroke	Normal R. P. M.	Fuel	Make and size of carburetor	Make of air cleaner	Make of magneto	Make of clutch	Make of gearset	Gearset type	Belt pulley diameter	Belt pulley R. P. M.	Belt speed F. P. M.	Speeds forward	Speed range, M. P. H.	Recommended plowing speed	Final drive	Drive	Furrow wheel	Line No.
77	4 x 5	1000	K	Holl.	Own	Own	Own	Own	S. G.	9	1000	2500	3	1-15	2½	Worm	In.	Yes	77
78	4½x 6	1000	G-K	1¼-King.	Ben.	Dixie	Mun.	Mun.	Sel. G.	14	710	2600	3	1-4	2½	.....	In.	Yes	78
79	4 x 6	900	K	1¼-King.	Ben.	King.	Own	Nutt.	Sl. G.	13	900	3075	2	2.3-3.8	2.3	G.	Op.	Yes	79
80	3½x 5¼	1150	G-K	1-King.	.....	King.	.....	.....	Fr.	.....	.....	.....	.....	1-15	2½-3	Ch.	Op.	Yes	80
81	4½x 6¼	875	G	1½-Ben.	Own	Dixie	Own	Own	.....	16	500	2100	2	2½-3	2½	G.	In.	.....	81
82	4½x 6¼	850	G-K	1½-Ben.	Ben.	K-W	Own	.....	Sl. G.	11	850	2600	2	2-2½	2½	Ch.	In.	No	82
83	6½x 7	750	K	1½-Scheb.	.....	K-W	Own	Own	Sl. G.	14	750	2750	2	1½-3.8	3	G.	Op.	Yes	83
84	4 x 6	1000	G-K	King.	Ben.	Dixie	Bier.	.....	Sl. G.	13	.....	2600	2	2¼-4	2-3	G.	Op.	Yes	84
85	3½x 4½	1600	G-K	1¼-Zen.	Ben.	Dixie	Own	Own	Plan.	12	800	2400	2	1½-7	2½	G.	In.	No	85
86	6 x 7	600	G-D	1½-King.	Donal.	K-W	Own	Own	Sl. J. C.	14	625	2290	2	2½-3½	2½	G.	In.	No	86
87	7½x 8	550	G-D	2-King.	Donal.	K-W	Own	Own	Sl. J. C.	16	467	2649	2	2½-3	2½	Ch.	In.	No	87
88	7½x 8	600	G-D	2½-King	Donal.	K-W	Own	Own	Sl. J. C.	16	510	2649	2	2.3-3.27	2.3	Ch.	In.	No	88
89	4½x 5¼	900	G-K	1¼-King.	Own	King.	Own	Own	S. G.	13	900	3083	2	2½-4	2½	G.	Op.	Yes	89
90	5 x 6½	400	K	1½-Strom.	Ben.	Dixie	Cotta	Footo	S. G.	14	600	2250	2	1½-3½	2½	.....	.....	.....	90
91	7½x 9	400	G-K	2 -King.	Ben.	Dixie	Own	.....	S. G.	30	400	3200	2	1½-2¼	2¼-2½	G.	Op.	No	91
92	6½x 8	500	K-D	Own	Own	K-W	Own	Own	S. G.	20	500	2000	2	1.8-2.5	2.5	Ch.	Op.	No	92
93	8½x 12	400	K-D	Own	Own	K-W	Own	Own	S. G.	20	400	2060	2	1.8-2.5	1.8-2.5	Ch.	Op.	No	93
94	5¼x 8	575	K-D	Own	Own	K-W	Own	Own	S. G.	18	575	2800	2	1.8-2.4	2.4	Ch.	In.	No	94
95	4½x 5½	900	K	1¼-Ben.	Ben.	Dixie	Cotta	Footo	Sl. G.	12	590	1850	2	2-3¼	2	G.	Op.	Yes	95
96	4½x 6	925	K	1½-Ben.	Ben.	Dixie	Cotta	Footo	Sl. G.	14	590	2600	2	2-3¼	2-3	G.	Op.	Yes	96
97	4 x 6	900	G-K	1½-Ben.	Ben.	Eise.	B. & B.	.....	Sl. G.	12	725	2300	2	2¼-4	2¾	G.	In.	Yes	97
98	3½x 5¼	950	G-K	1-Ben.	Ben.	Dixie	Own	Own	S. G.	10	950	2500	2	2½-6	2¾	G.	In.	Yes	98
99	6½x 8	.....	K	1½-Scheb.	Ben.	K-W	Own	Own	Sl. G.	16	650	2700	2	2-4¼	2½	G.	In.	Yes	99
100	5 x 5	800	K	1½-Scheb.	Ben.	A-K	.....	Own	.....	24	320	.....	2	2.2-3.25	.....	G.	.....	.....	100
101	5¼x 6	800	K	1½-Scheb.	.....	A-K	.....	Own	.....	28	350	.....	1	2¼	.....	G.	.....	.....	101
102	6¼x 7	600	K	2 -Scheb.	.....	K-W	.....	Own	.....	32	275	.....	1	2¼	.....	G.	.....	.....	102
103	7½x 8	450	K	2 -Scheb.	.....	A-K	.....	Own	.....	34	275	.....	1	2¼	.....	G.	.....	.....	103
104	6 x 7	750	K	1½-King.	Own	A-K	Own	Own	Sl. G.	11	750	2100	1	2½	2½	G.	Op.	Yes	104
105	6 x 7	750	K	1½-King	Ben.	A-K	Own	Own	Sl. G.	11	750	2100	1	2½	2½	G.	Op.	Yes	105
106	5 x 6½	650	G-K	1¼-Ray.	Ben.	Dixie	.....	Own	.....	14	800	2600	2	2½-5	.....	Ch.	In.	Yes	106
107	4½x 6	950	G-K	1½-King.	Own	Dixie	Own	Nutt.	Sel. G.	18	475	2200	2	1½-3	2½	G.	In.	Yes	107
108	4½x 6	1000	G-K	1½-Zen.	Own	Dixie	Own	Own	Sel. G.	16	575	2400	2	1½-4	2.6	G.	In.	No	108
109	5½x 7	.....	G	2½-Any	.....	Dixie	Spec.	Spec.	Sel. G.	.....	.....	.....	3	.....	2-4	Worm	In.	.....	109
110	5 x 6½	.....	.....	Strom.	.....	Dixie	.....	.....	.....	12	900	2600	2	2½-4½	.....	.....	.....	Yes	110
111	4½x 5	900	K	1¼-King.	Own	K-W	Own	Own	Sl. G.	9	900	2100	3	1½-6	3	G.	In.	No	111
112	5¼x 6	750	K	1½-King.	Own	K-W	Own	Own	Sl. G.	13	750	2500	3	1½-6	3	G.	In.	No	112
113	5½x 7	750	K	1½-King.	Donal.	King.	Own	.....	.....	12	750	2350	1	2½	2.4	G.	Op.	Yes	113
114	4½x 5¼	1000	G-K	.....	Own	.....	.....	.....	.....	12	800	2512	2	2-3	.....	S. G.	Op.	.....	114
115	4½x 6	1000	K	1¼-H-S	Ben.	K-W	.....	.....	Sl. G.	16	650	.....	2	2.2-2.9	.....	.....	In.	Yes	115
116	5 x 7½	650	G-K	1¼-King.	Ben.	K-W	Own	Own	Sl. G.	17	528	2400	2	2-2¼	2-2¾	S. G.	In.	No	116
117	6¼x 8	600	G-K	2 -King.	.....	K-W	Own	Own	Sl. G.	20	600	3150	2	1.4-2	2	S. G.	Op.	No	117
118	7½x 9	500	G-K	2½-King.	.....	K-W	Own	.....	.....	23	500	2900	1	2	2	S. G.	Op.	No	118
119	7½x 9	500	G-K	3 -King.	.....	K-W	Own	.....	.....	23	500	2900	1	2	2	S. G.	Op.	No	119
120	3½x 5	1800	G	1¼-Holl.	Ben.	Remy	B. & B.	Own	Sl. G.	9	1200	2900	1	3½	3-3½	S. G.	In.	Yes	120
121	3½x 4	900	G-K	1 -King.	Ben.	K-W	Bier.	Footo	Sel. G.	.....	750	.....	1	2	2	Ch.	Op.	No	121
122	4 x 6	800	G-K	1¼-King.	Ben.	K-W	Bier.	Footo	Sel. G.	.....	500	.....	2	1½-2¼	2	Ch.	Op.	No	122
123	4½x 6	800	G-K	1½-King.	Ben.	K-W	Own	Own	Sel. G.	.....	565	.....	2	1½-2¼	1¾	Ch.	Op.	No	123
124	3½x 5¼	1000	G-K	1 -Ben.	Ben.	.....	Rock.	Own	Fr.	10	600	.....	6	2-3½	2-2½	S. G.	In.	Yes	124
125	4½x 5¼	900	K	1¼-King.	Ben.	Eise.	Rock.	Own	Fr.	10	1000	.....	6	2-3½	2-2½	S. G.	In.	Yes	125
126	4½x 5¼	900	G-K	1½-King.	Ben.	K-W	Own	Own	Sel. G.	20	400	1992	2	2½-5½	2½	Ch.	In.	Yes	126
127	4½x 6¼	800	G-K	1¼-King.	Ben.	K-W	Own	Own	Sel. G.	24	360	2160	2	2½-5½	2½	Ch.	In.	Yes	127
128	5½x 6½	750	G	1½-Ben.	.....	Dixie	Own	Own	Sel. G.	11	750	2100	3	1¼-4	2½	Ch.	Op.	No	128
129	4½x 5½	1000	K	1¼-King.	Own	Eise.	Own	.....	Sl. G.	12	1000	3140	2	2¾-4	.....	S. G.	Op.	Yes	129
130	4½x 5½	1000	K	1¼-King.	Own	Eise.	Own	.....	Sl. G.	12	1000	3140	3	1¼-4	.....	S. G.	In.	Yes	130
131	5½x 6	750	K	1½-King.	Ben.	K-W	Own	Own	Sl. G.	14	750	2750	3	1¼-4	2½	Ch.	In.	Yes	131
132	7 x 8	600	K	2 -King.	Ben.	K-W	Own	Own	Sl. G.	18	600	2700	3	1¼-4	2¼	S. G.	In.	No	132
133	4 x 6	900	G-K	1¼-King.	Ben.	King.	.....	.....	Fr.	14	1065	3900	6	1¼-4	2	S. G.	In.	Yes	133
134	4½x 5½	800	G-K	1 -King.	Ben.	Dixie	Own	.....	Fr.	12	600	2200	7	1-4	2¼	S. G.	Op.	Yes	134
135	5½x 6¼	750	G-K	1½-King.	Ben.	Dixie	Own	.....	Fr.	14	700	2200	7	1-4	2¼	S. G.	Op.	.....	135
136	4 x 6	900	K	1½-King.	.....	King.	.....	.....	.....	18	600	2828	2	2-3	2½	Ch.	Op.	.....	136
137	4½x 5¼	1000	K	1¼-King.	Ben.	Bosch	Own	Cotta	Sl. G.	12½	915	3000	3	1½-3¾	2¼	S. G.	Op.	.....	137
138	4½x 6¼	950	K	1¼-King.	Ben.	Dixie	Own	Cotta	Sl. G.	12½	810	2850	3	1½-3¾	2¼	S. G.	Op.	.....	138
139	5½x 7	825	K	1½-King	Ben.	Dixie	Own	Own	Sl. G.	12½	840	2749	2	2.4-3¾	2.4	S. G.	Op.	.....	139
140	8 x 10	525	K	2 -King.	Ben.	Bosch	Own	Own	Sl. G.	24	525	3310	2	2-4½	2	S. G.	Op.	.....	140
141	4 x 6	900	K	.....	Ben.	Dixie	.....	.....	.....	.....	900	.....	2	2-3½	2½	Ch.	Op.	No	141
142	5 x 6½	850	G-K	1½-Strom.	Ben.	Dixie	Own	.....	.....	12	850	1838	2	2-2½	2	S. G.	In.	Yes	142
143	3½x 4½	950	G	1 -Scheb.	Ben.	A-K	Own	Own	Sl. G.	6	1200	1880	4	2.1-3.6	2½	Ch.	Op.	Yes	143
144	4½x 6	950	K	1¼-King.	Own	Dixie	Own	.....	.....	12½	1200	3900	1	.....	2-3½	S. G.	In.	Yes	144
145	4½x 6¼	900	G	King.	Ben.	Eise.	B. & B.	Own	.....	14	.....	2700	3	1¼-4	2¾	G.	In.	.....	145
146	3½x 5¼	1000	K	1¼-King.	Ben.	Dixie	Own	Footo	Sel. G.	14	600	2200	2	1½-3	1½-2½	R. P.	Op.	Yes	146
147	4½x 5½	1000	K	1¼-King.	Ben.	Dixie	Own	Footo	Sel. G.	14	600	2030	2	1½-3	1½-2½	R. P.	Op.	Yes	147
148	5½x 6½	850	G	.....	Ben.	.....	.....	.....	.....	12	900	.....	2	2½-2¾	.....	G.	In.	Yes	148
149	4½x 6	900	K	.....	Ben.	.....	.....	.....	.....	12½	1000	.....	2	2½-5	.....	G.	In.	Yes	149
150	4½x 5¼	900	G-K	1¼-Ben.	Ben.	K-W	Own	Own	Sel. G.	18	430	2030	2	2½-3½	2½	S. G.	In.	Yes	150
151	6½x 7	750	K	1½-Scheb.	Own	Dixie	Own	.....	Sl. G.	14	750	2750	2	2¼-3	2¼	S. G.	Op.	Yes	151
152	5 x 6½	750	G	1¼-King.	Ben.	A-K	Bier.	Own	Sl. G.	12	750	2358	1	2¼	2¼	R. P.	In.	Yes	152
153	5 x 6½	800	K	1½-Strom.	Ben.	Eise.	B. & B.	Footo	Sl. G.	16	575	2660	2	1¼-4	2½	S. G.	Op.	Yes	153
154	5 x 7	600	G-K	1½-Per.	.....	A-K	Own	.....	.....	6	600	960	2	1½-2½	2	.....	.....	Yes	154
155	4½x 5½	900	K	1¼-Car.	.....	Bosch	.....	.....	Sel. G.	12	800	2500	4	1-5	2½	S. G.	In.	No	155

matic; Weid., Weidely; Clim., Climax; Twin, Twin City; Cont., Continental; Ruten., Rutenber; Over., Overland; Kenn., Kenneth. Cylinders—Ver., vertical; Hor., horizontal; Ensign; Strom., Stromberg; Till., Tillotson; Zen., Zenith; Car., Carter; Perr., Perrin-Ingram. Air Cleaner—Donal., Donaldson; Ben., Bennett; Holl., Holley. Magneto—A-K, S., Brown & Sharpe; Nutt., Nuttall. Gearset type—Sl. G., sliding gear; Sel. G., selective gear; Fr., friction; Plan., planetary; Sl. J. C., sliding jaw clutch. Final drive—S. G.,

Buyer's Guide to Tractors

FACTORY RATING OF HORSEPOWER USED

One and Two Plows

Name and Model	Drawbar HP.	Belt HP.	Price	Traction	Cylinders	Fuel
Adams	9	13	\$ 850	2 wh.	1 hor.	G-K
Allis-Chalmers	10	18	1250	2 wh.	2 opp.	G-K
Auto Tiller	8	16	365	2 wh.	1 hor.	G-K
Avery	5	10	....	2 wh.	4 ver.	G-K
Beltrail	12	20	1600	1 cr.	4 ver.	G-D
Blumberg	9	18	850	2 wh.	4 ver.	G
Case	10	18	1225	2 wh.	4 ver.	K
Chase	9	18	1200	2 wh.	4 ver.	G
Cleveland	12	20	1585	2 cr.	4 ver.	G-K
Elgin B.	9	18	1075	2 wh.	4 ver.	G
Emerson-Brantingham	9	16	....	2 wh.	4 ver.	K
Fageol	10	18	1500	2 wh.	4 ver.	G-D
Fordson	12	20	....	2 wh.	4 ver.	K
Fulton	10	..	1275	2 wh.	4 ver.	G-K
Heider D.	9	16	1070	2 wh.	4 ver.	G-K
Indiana	5	10	900	2 wh.	4 ver.	G
Lightfoot	6	10	1250	2 cr.	4 ver.	G-K
Moline Universal D.	9	18	1500	2 wh.	4 ver.	G
Multipedal	5	10	....	{2 w. or 2 c.}	4 ver.	G-K
National E.	9	16	1075	2 wh.	4 ver.	G-K
Prairie Dog	9	18	1150	1 wh.	4 ver.	G-K
Russel Junior	12	24	....	2 wh.	4 ver.	K
Track Pull	6	10	1340	1 cr.	4 ver.	D
Whitney	9	18	1050	2 wh.	2 opp.	G

Three Plows

Acme	12	25	1800	2 wh.	4 ver.	G-K
Acme	12	25	2250	2 cr.	4 ver.	G-K
Allwork	14	28	1460	2 wh.	4 ver.	K
Andrews	12	20	1000	2 wh.	4 opp.	G
Appleton	12	20	....	2 wh.	4 ver.	G-K
Avery	8	16	....	2 wh.	2 opp.	G-K
Bates Steel Mule	12	20	....	2 cr.	4 ver.	G-K
Blumberg	12	24	1250	2 wh.	4 ver.	G
Boring	12	20	1485	2 wh.	4 ver.	G-K
Bull	12	24	1075	1 wh.	2 opp.	K
Brillion	12	22	....	2 wh.	4 opp.	K
Case	10	20	1325	2 wh.	4 ver.	K
C. O. D.	13	25	1395	2 wh.	2 hor.	K
Dart J.	15	30	1750	1 wh.	4 ver.	G
Eagle F.	12	16	1522	2 wh.	2 hor.	K
Elgin E.	10	20	1385	2 wh.	4 ver.	G-K
Emerson-Brant. A. A.	12	20	....	2 wh.	4 ver.	K
Emerson-Brant. 12-20	12	20	....	2 wh.	4 ver.	K
Farmer Boy	10	20	1350	1 wh.	4 ver.	K
Farm Horse	16	34	1485	2 wh.	4 ver.	K
Fitch	15	26	2500	2 wh.	4 ver.	G-K
Frick	12	25	....	2 wh.	4 ver.	K
Happy Farmer F.	12	24	1150	2 wh.	2 hor.	K
Hart-Parr	15	31	1395	2 wh.	2 hor.	K
Heider C.	12	20	1395	2 wh.	4 ver.	G-K
Hession	13	25	1675	2 wh.	4 ver.	G-K
Hollis	15	25	1375	2 wh.	4 ver.	G-K
Huber Light Four	12	25	1285	2 wh.	4 ver.	G-K
Keck-Gonnerman	12	24	1500	2 wh.	2 hor.	K
LaCrosse G.	12	24	1250	2 wh.	2 hor.	K
Leader B.	12	18	1000	2 wh.	2 opp.	K
Mogul (T. H. C.)	10	20	1125	2 wh.	1 hor.	K-D
Multipedal	15	30	....	{2 w. or 2 c.}	4 ver.	G-K
National F.	16	22	1375	2 wh.	4 ver.	K
Neverslip M.	12	20	1850	2 cr.	4 opp.	G-K
Parrett F.	12	25	....	2 wh.	4 ver.	K
Parrett H.	12	25	....	2 wh.	4 ver.	K
Plowman	13	30	....	2 wh.	4 ver.	K
Plowman	15	30	....	2 wh.	4 ver.	K
Port Huron	12	25	1500	2 wh.	4 ver.	G-K
Royer	12	25	1225	2 wh.	4 ver.	K
Rumely Oilpull	12	20	....	2 wh.	2 hor.	K-D
Russel Little Boss	15	30	....	2 wh.	4 ver.	K
Sandusky J.	10	20	1500	2 wh.	4 ver.	G-K
Short Turn	30	..	1550	2 wh.	4 ver.	K
Titan (I. H. C.)	10	20	1225	2 wh.	2 hor.	K-D
Turner-Simplicity	12	20	1395	2 wh.	4 ver.	K
U. S. B.	12	22	975	2 wh.	2 opp.	G
Wallis Cub, Jr.	15	25	1600	2 wh.	4 ver.	G-K
Waterloo Boy	12	25	....	2 wh.	2 hor.	K
Wichita A.	8	16	1025	2 wh.	2 opp.	G
Zelle	12	25	2000	2 wh.	4 ver.	K

Four Plows

Name and Model	Drawbar HP.	Belt HP.	Price	Traction	Cylinders	Fuel
Atlas	16	26	1150	2 wh.	4 ver.	G-K
Aultman-Taylor	15	30	....	2 wh.	4 ver.	G-K
Aultman-Taylor	18	36	....	2 wh.	4 opp.	G-K
Avery	12	25	....	2 wh.	2 opp.	G-K
Avery	18	36	....	2 wh.	4 opp.	G-K
Big Boss	20	40	....	2 wh.	4 ver.	K
Buckeye 40	16	30	5500	2 cr.	4 ver.	G-K
Bullock Creeping Grip	15	25	2000	2 cr.	4 ver.	G-K
Case	15	27	1600	2 wh.	4 ver.	K
Coleman	16	30	1750	2 wh.	4 ver.	G-K
Dill	20	..	2480	2 wh.	4 ver.	G
Eagle	22	30	1853	2 wh.	2 hor.	K
Farquhar	15	25	....	2 wh.	4 ver.	G-K
Gile Q.	18	..	....	2 wh.	4 ver.	G-K
Gray	18	36	2250	Drum	4 ver.	G-K
Illinois C.	18	36	2150	2 wh.	4 ver.	K
International	15	30	....	2 wh.	4 ver.	K-D
Lang	15	30	1485	2 wh.	4 ver.	G-K
Lauson	15	25	1895	2 wh.	4 ver.	G-K
Leonard	20	30	2000	2 wh.	4 ver.	G-K
Little Giant B.	16	22	1650	2 wh.	4 opp.	K
Multipedal	20	40	....	2 cr.	4 ver.	G-K
Neverslip N.	18	30	2250	2 cr.	4 ver.	G-K
Nilson Junior	16	25	1775	2 wh.	4 ver.	G-K
Pioneer F.	15	30	....	2 wh.	4 opp.	K
Rumely Oilpull	16	30	....	2 wh.	2 hor.	K-D
Sandusky E.	15	35	2500	2 wh.	4 ver.	G-K
Stinson	18	36	....	4 wh.	4 ver.	K
Square Turn	18	35	1875	2 wh.	4 ver.	G-K
Turner-Simplicity	14	25	1675	2 wh.	4 ver.	K
Trundaar	20	35	....	2 cr.	4 ver.	G-K-D
Twin City 16	16	30	....	2 wh.	4 ver.	G-K
U. S. C.	18	30	1450	2 wh.	4 ver.	K
Wisconsin E.	16	32	2250	2 wh.	4 ver.	K

Five to Six Plows

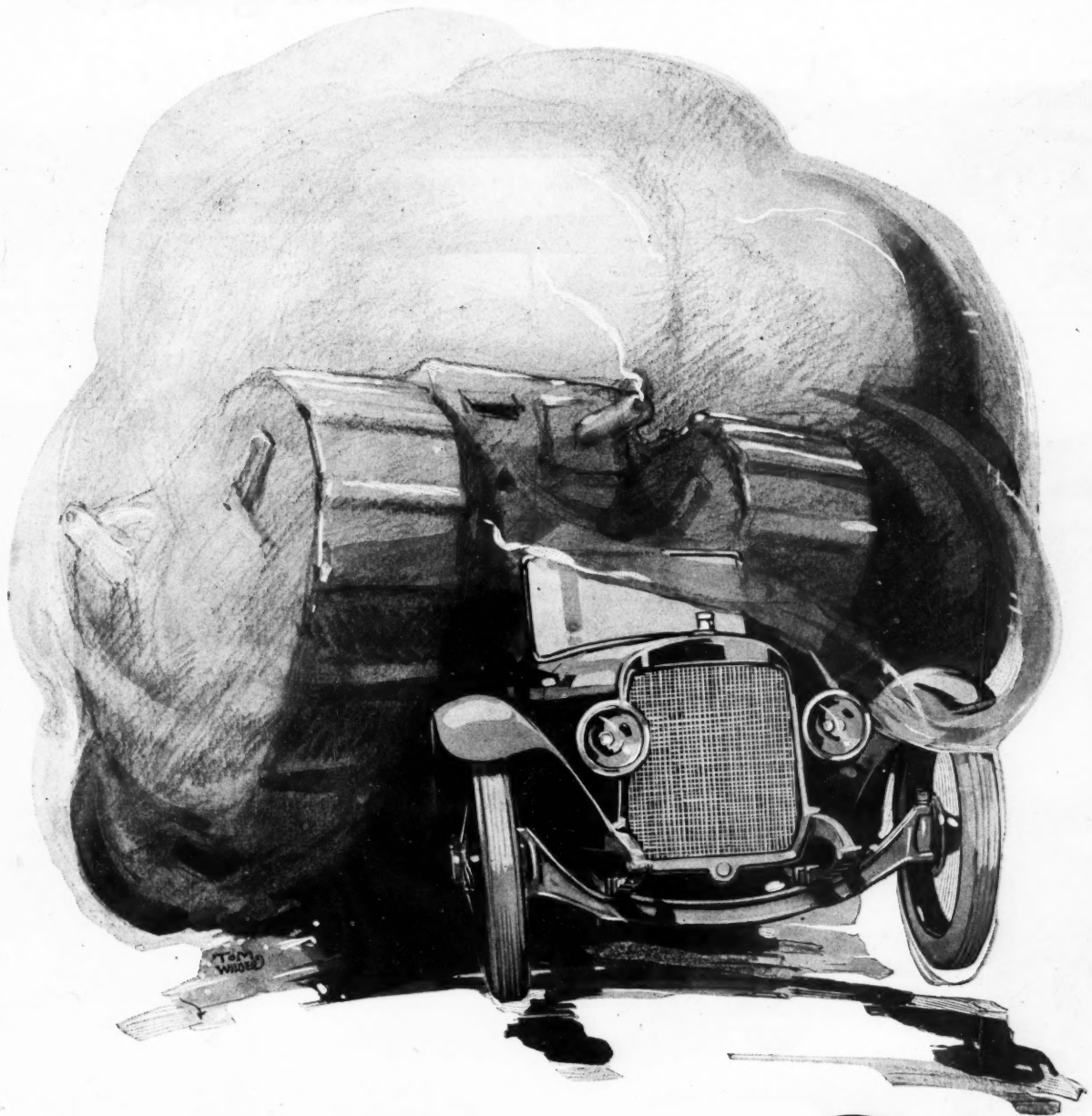
Aultman-Taylor	25	50	....	2 wh.	4 opp.	G-K
Avery	25	50	....	2 wh.	4 opp.	G-K
Best Tracklayer	20	40	4100	2 cr.	4 ver.	D
Best Tracklayer	38	75	5750	2 cr.	4 ver.	D
Buckeye 60	24	45	6500	2 cr.	4 ver.	G-K
Bullock Senior	35	50	4500	2 cr.	4 ver.	G-K
Capital 20	20	..	3000	2 wh.	2 opp.	—
Capital 30	30	..	4000	2 wh.	2 opp.	—
Case	20	40	3000	2 wh.	2 opp.	K
Emerson-Brantingham	20	35	....	2 wh.	4 ver.	K
Evans K.	20	35	2000	2 wh.	4 ver.	K
Farquhar	18	35	....	2 wh.	4 ver.	G-K
Farquhar	25	50	....	2 wh.	4 ver.	G-K
Holt-Caterpillar	25	45	....	2 cr.	4 ver.	G-D
Leader C.	18	36	2250	2 cr.	4 ver.	K
Little Giant A.	26	35	2500	2 wh.	4 opp.	K
Multipedal	25	50	....	2 cr.	4 ver.	G-K
Nilson Senior	24	36	2475	2 wh.	4 ver.	G-K
Rumely Oilpull	20	40	....	2 wh.	4 hor.	K-D
Topp-Stewart B.	20	35	2750	4 wh.	4 ver.	G
Twin City 25	25	45	....	2 wh.	4 ver.	G-K

Eight to Ten Plows

Aultman-Taylor	30	60	....	2 wh.	4 opp.	G-K
Avery	40	80	....	2 wh.	4 opp.	G-K
Capital 45	45	..	4400	2 wh.	2 opp.	—
Emerson-Brantingham	40	65	....	2 wh.	4 ver.	K
Holt-Caterpillar	40	75	....	2 cr.	4 ver.	G-D
Imperial	40	70	4500	2 wh.	4 opp.	G-K
Pioneer C.	30	60	....	2 wh.	4 opp.	K
Rumely Oilpull	30	60	....	2 wh.	2 hor.	K-D
Russel Giant	30	60	....	2 wh.	4 ver.	K
Twin City 40	40	65	....	2 wh.	4 ver.	G-K

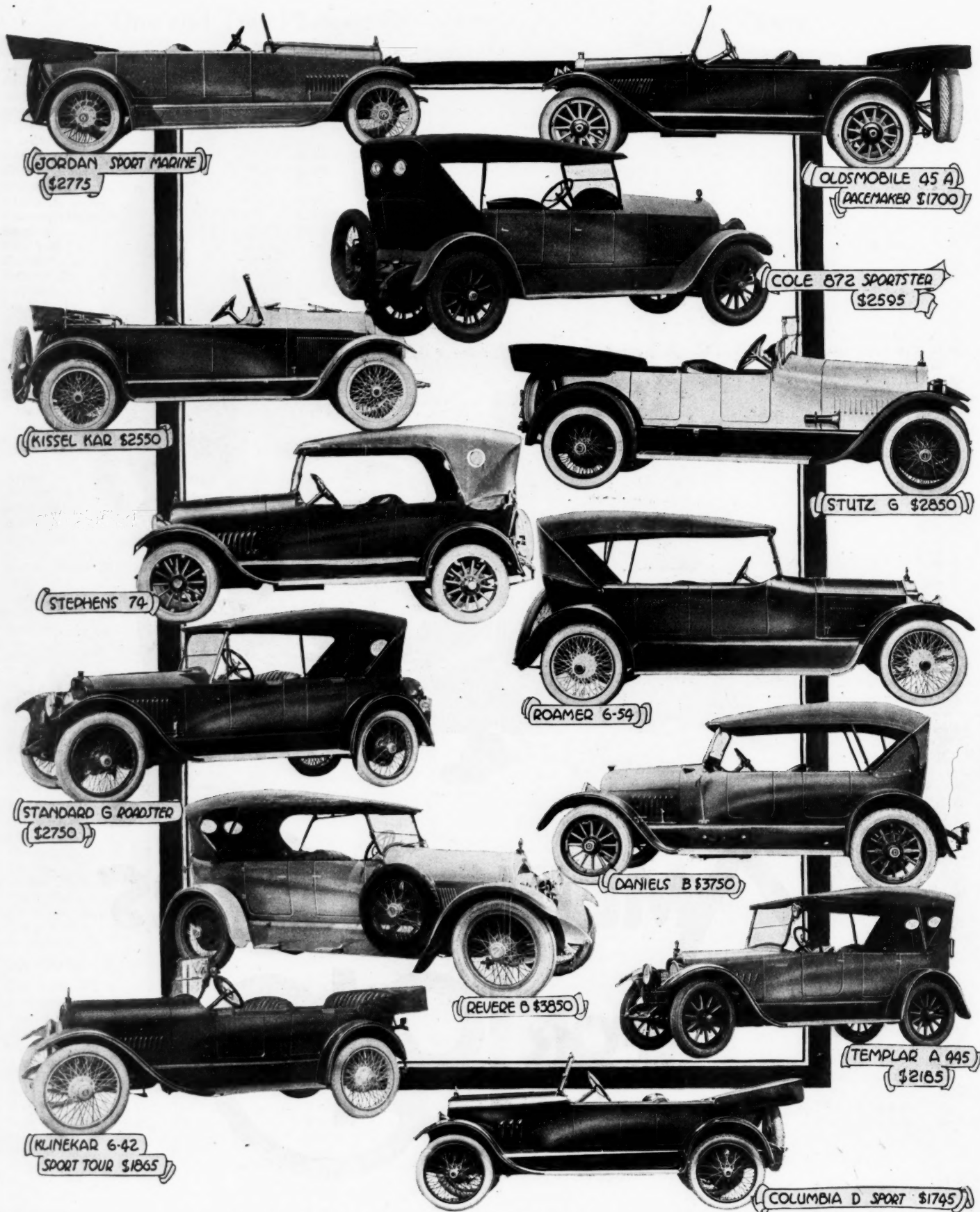
Twelve to Fifteen Plows

Aultman-Taylor	30	60	....	2 wh.	4 opp.	G-K
Bullock Giant	50	75	5000	2 cr.	4 ver.	G-K
Capital 75	75	..	6000	2 wh.	2 opp.	—
Holt-Caterpillar	70	120	....	2 cr.	6 ver.	G-D
Multipedal	75	125	....	2 cr.	4 ver.	G-K
Twin City 60	60	90	....	2 wh.	6 ver.	G-K



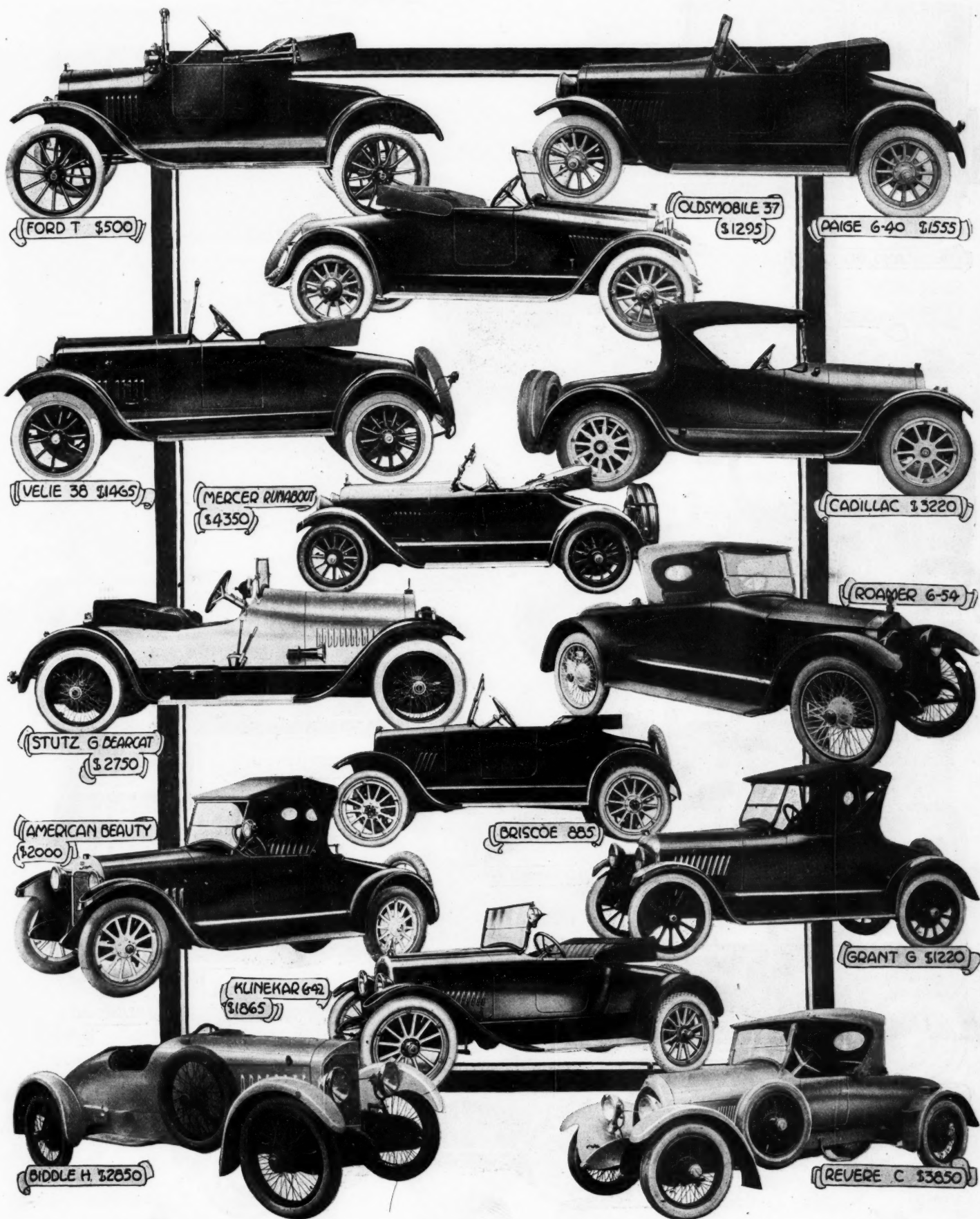
AMERICA'S CARS FOR 1919

Four-Passenger Touring Cars



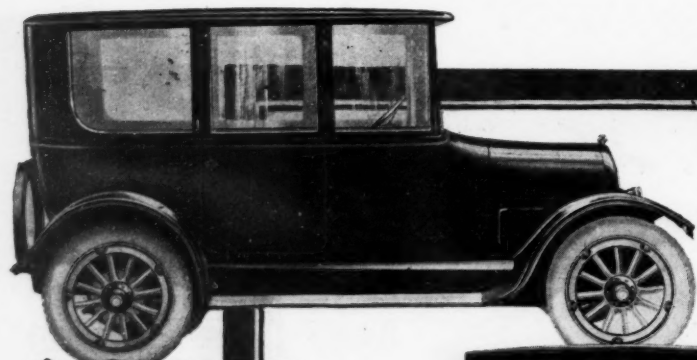
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Two-Passenger Roadsters

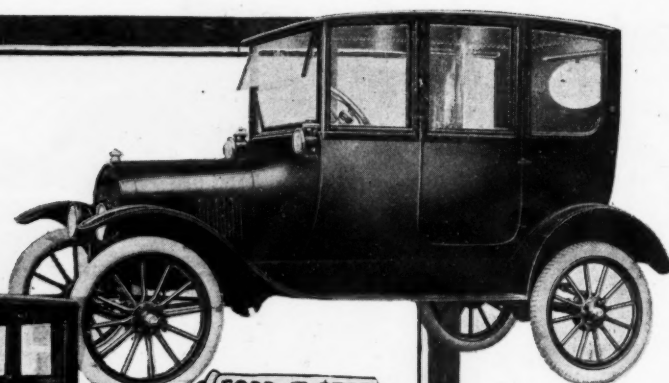


Prices and specifications of all cars illustrated on this page appear on pages 33-41

Sedans



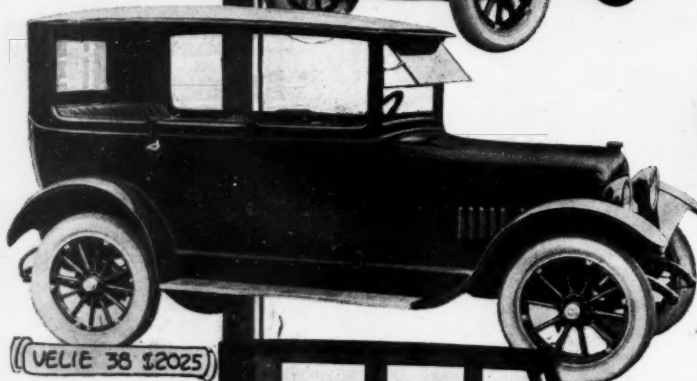
OVERLAND 90 \$1495



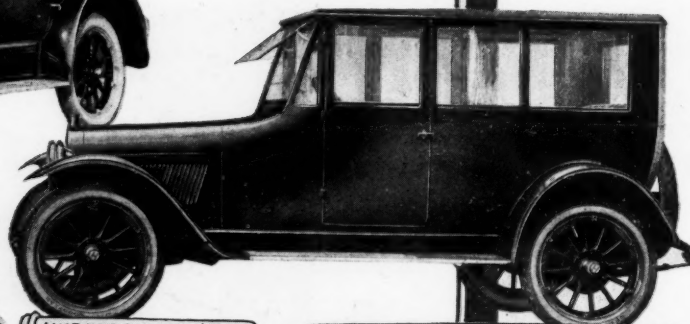
FORD T \$775



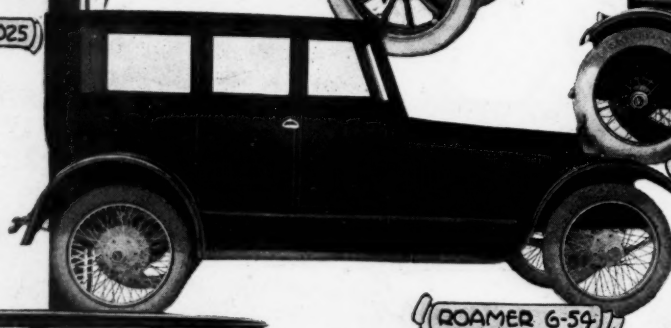
JORDAN \$3750



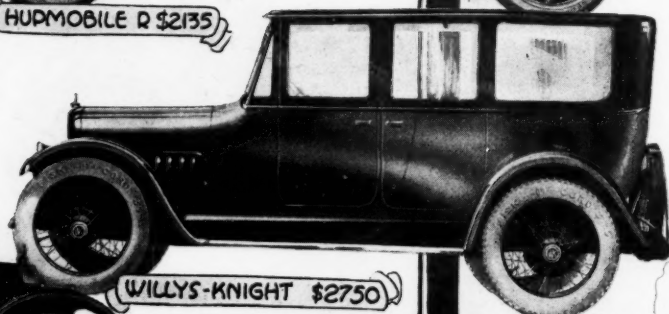
VELIE 38 \$2025



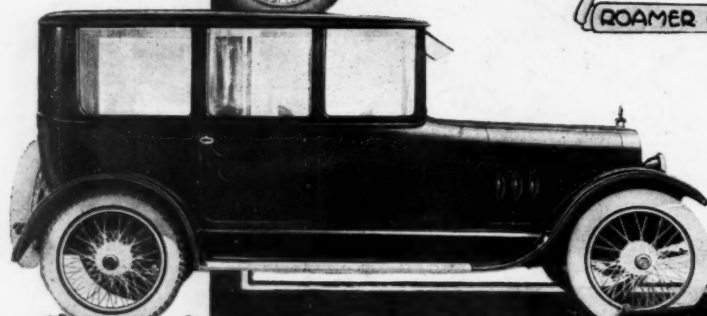
HUPMOBILE R \$2135



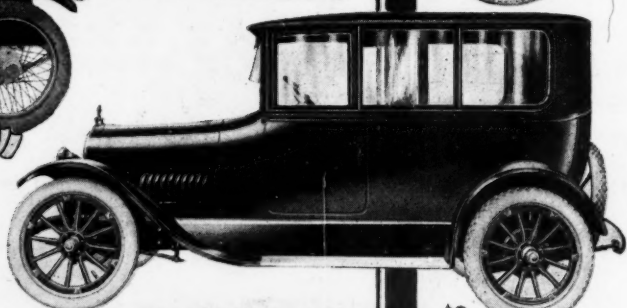
ROAMER 6-54



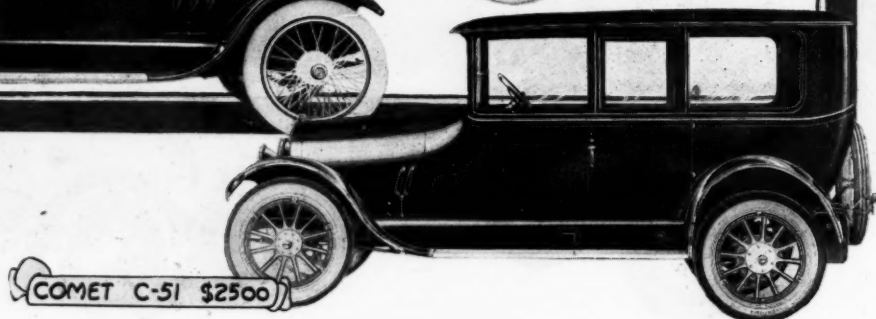
WILLYS-KNIGHT \$2750



COLUMBIA
\$2445



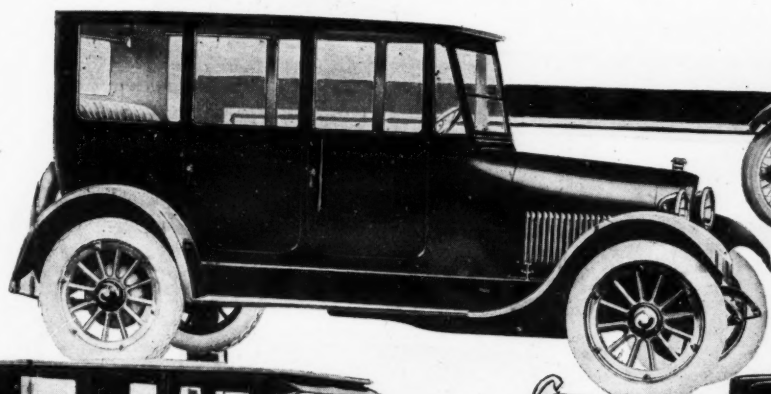
KLINEKAR
\$2590



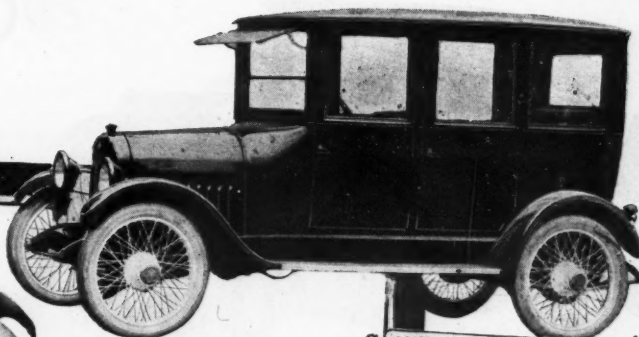
COMET C-51 \$2500

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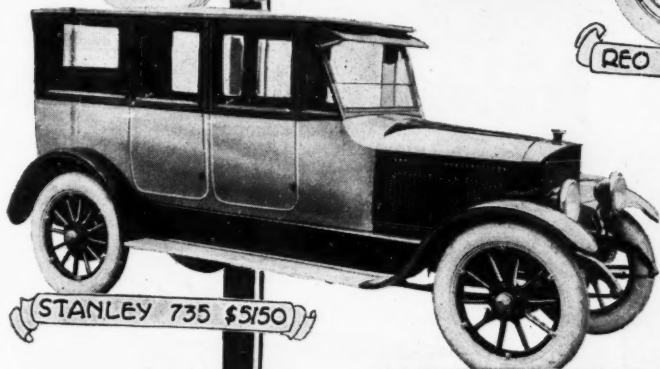
Sedans



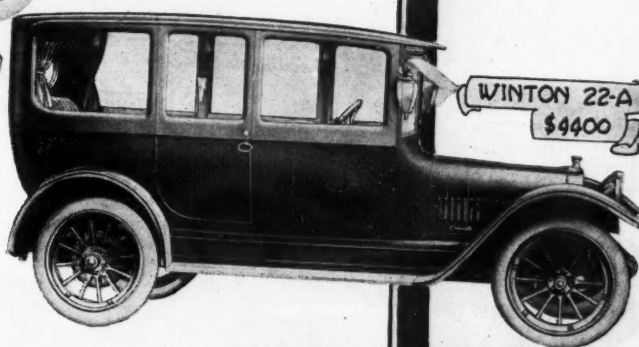
REO \$2175



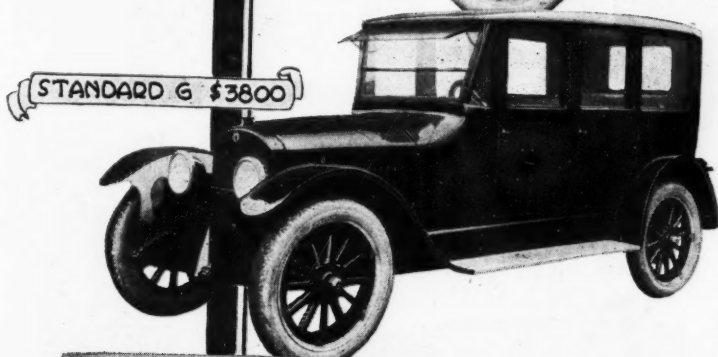
MAXWELL 25 \$1565



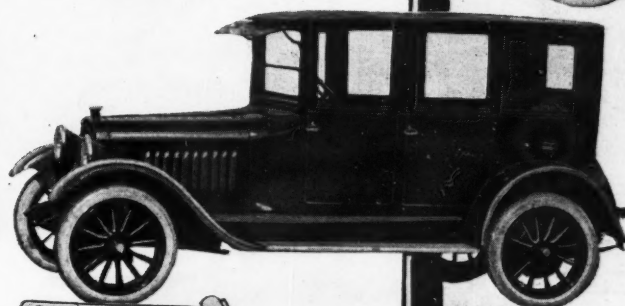
STANLEY 735 \$5150



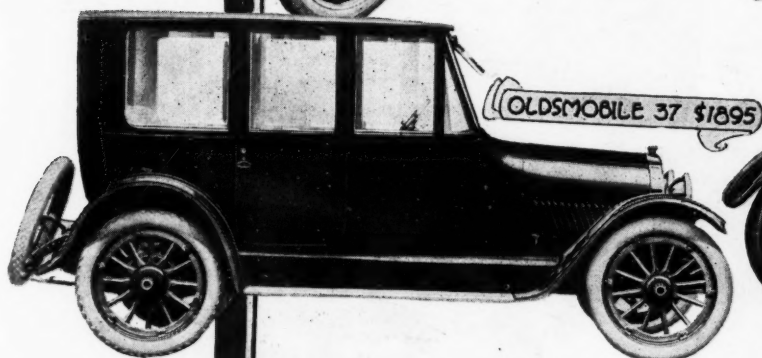
WINTON 22-A
\$4400



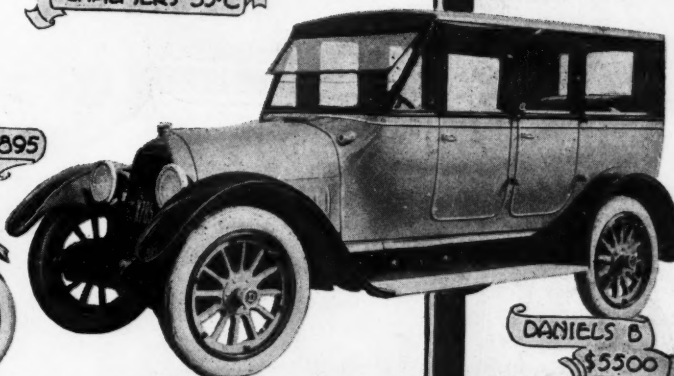
STANDARD 6 \$3800



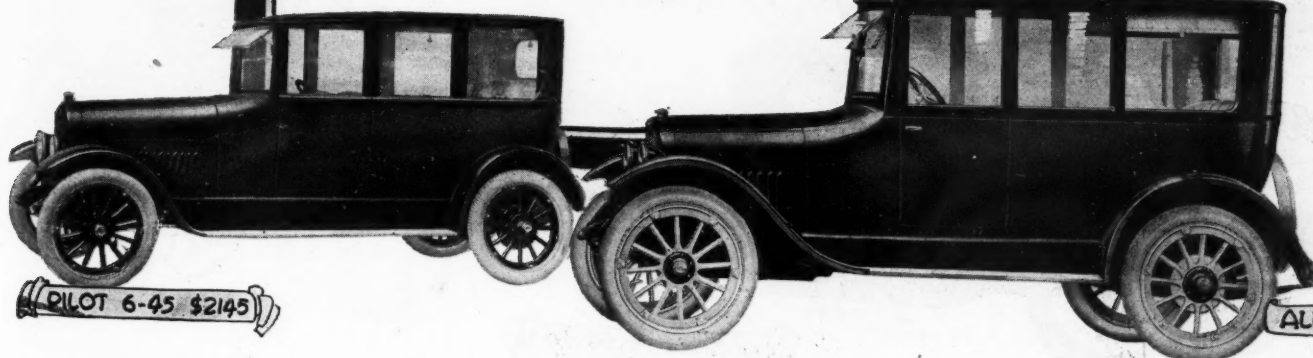
CHALMERS 35-C



OLDSMOBILE 37 \$1895



DANIELS 8
\$5500

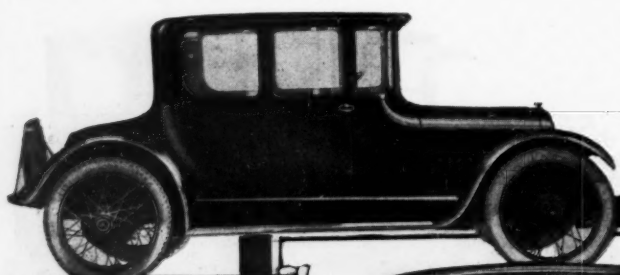


PILOT 6-45 \$2145

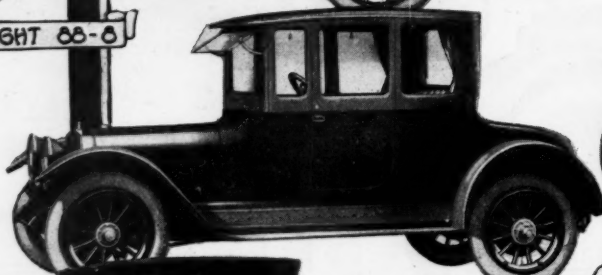
ALLEN 4
\$1695

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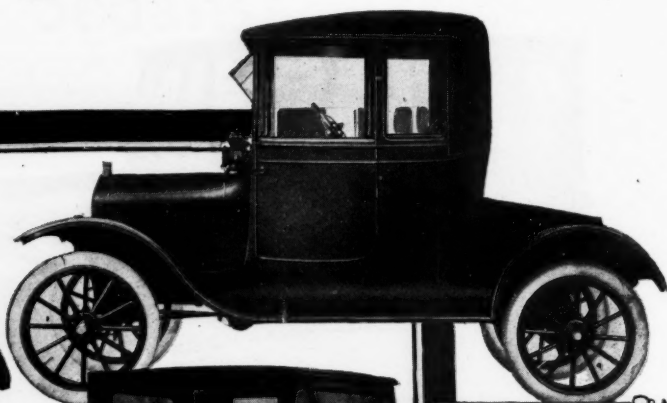
Coupes



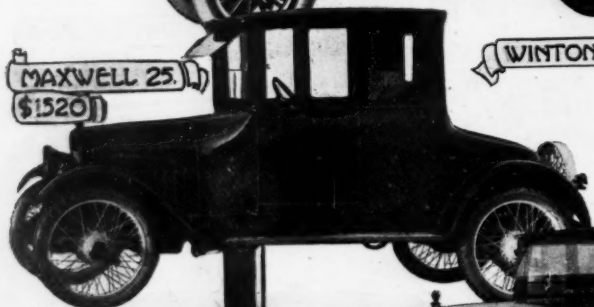
WILLYS-KNIGHT 88-8



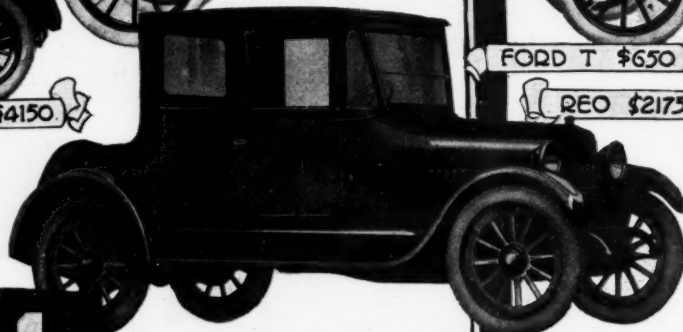
WINTON 22-A \$4150



FORD T \$650



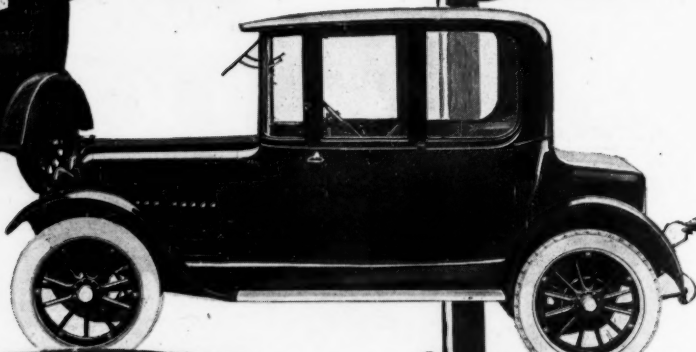
MAXWELL 25 (\$1520)



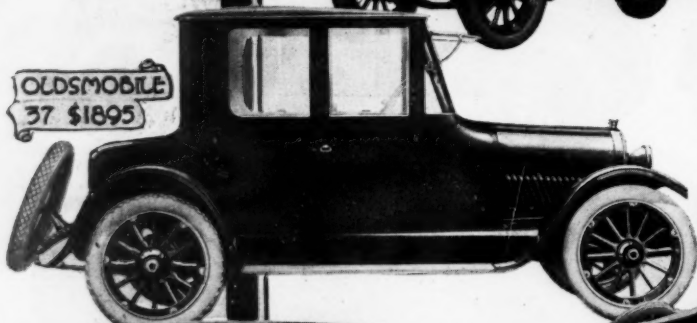
REO \$2175



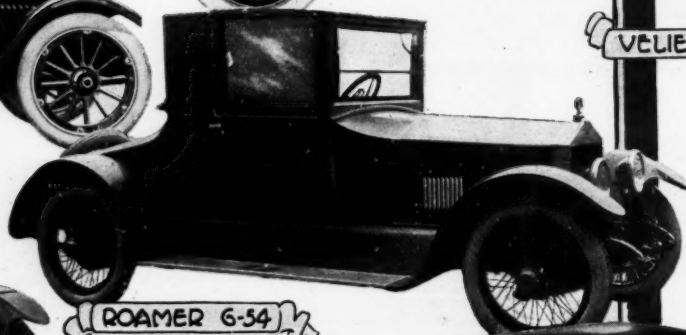
COLE 873 \$3795



VELIE 38 \$2025



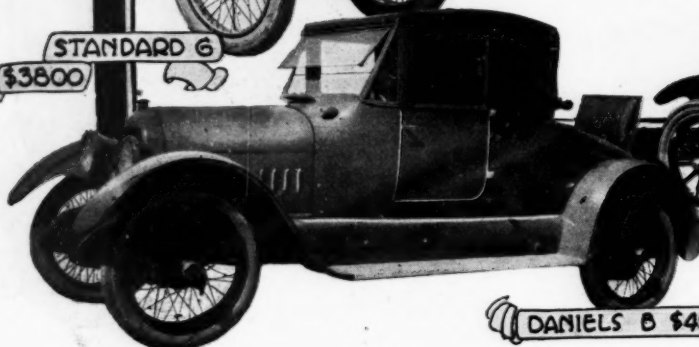
OLDSMOBILE 37 \$1895



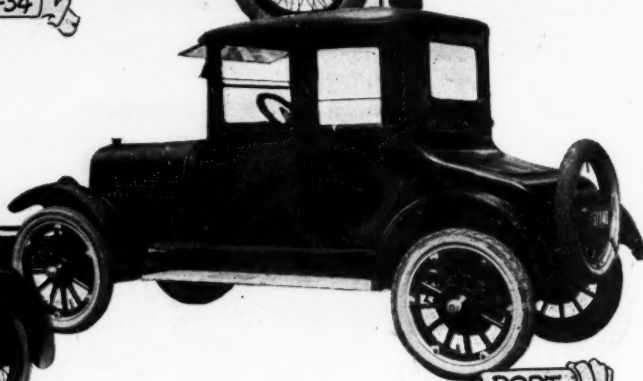
ROAMER 6-34



STANDARD 6 (\$3800)



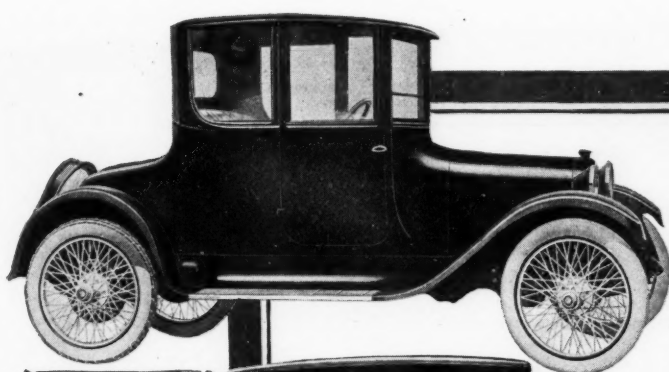
DANIELS 8 \$4500



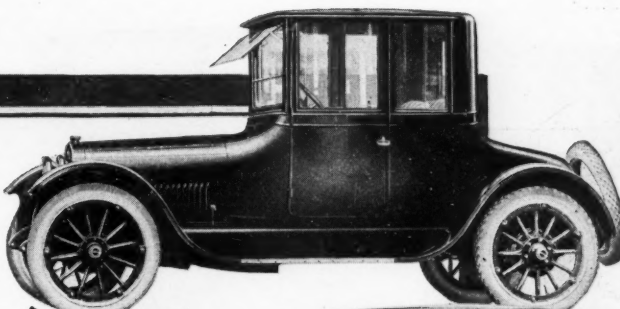
DORT

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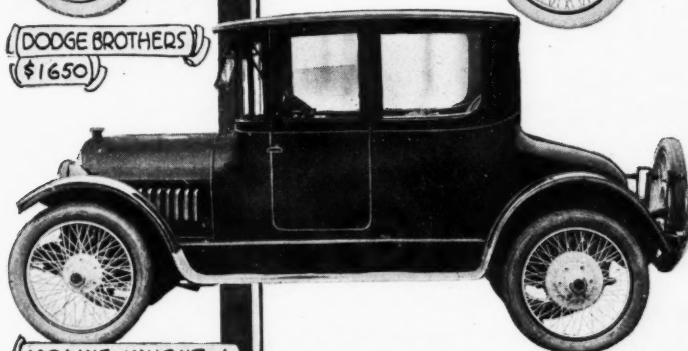
Coupes



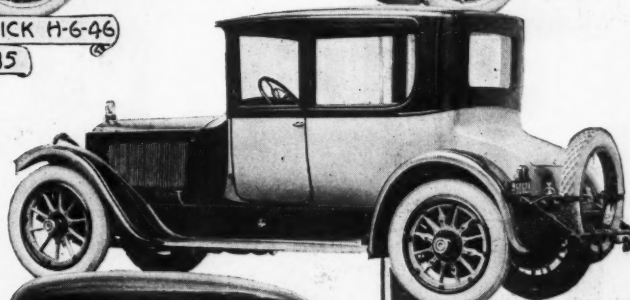
(DODGE BROTHERS)
(\$1650)



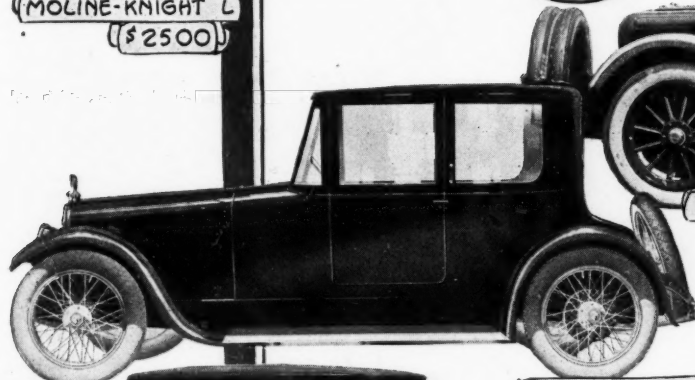
(BUICK H-6-46)
(\$1985)



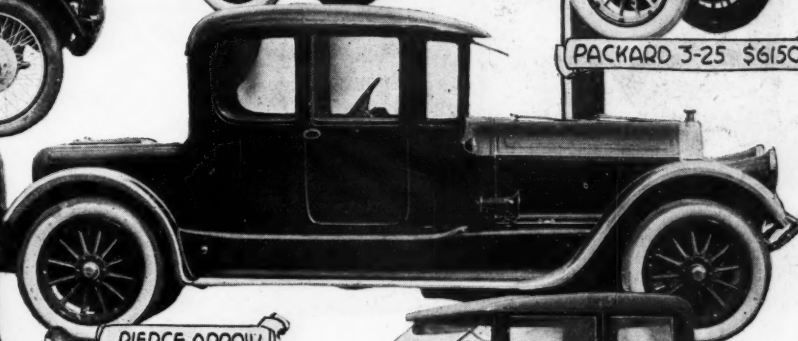
(MOLINE-KNIGHT L)
(\$2500)



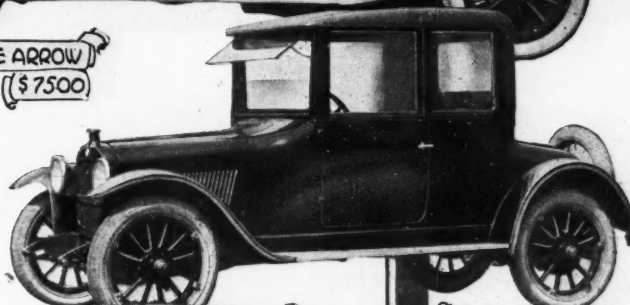
(PACKARD 3-25 \$6150)



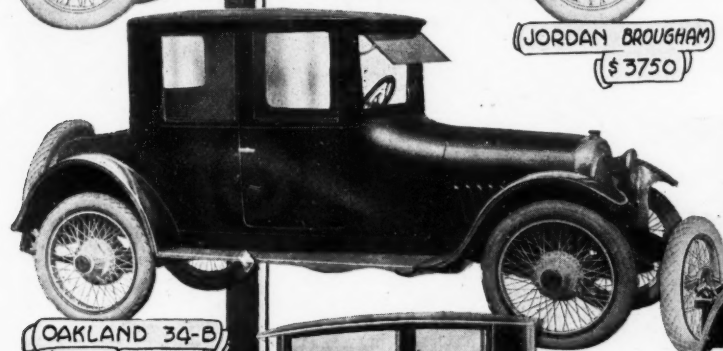
(JORDAN BROUGHAM)
(\$3750)



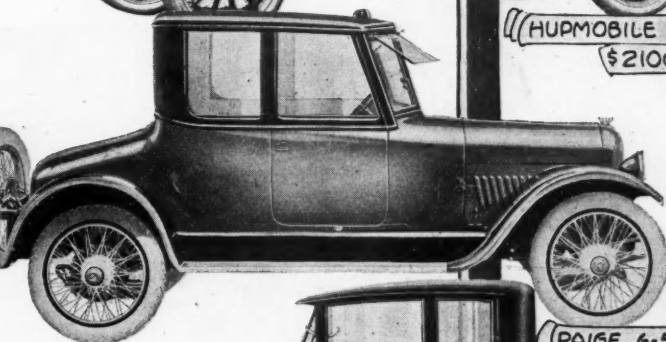
(PIERCE ARROW)
(\$7500)



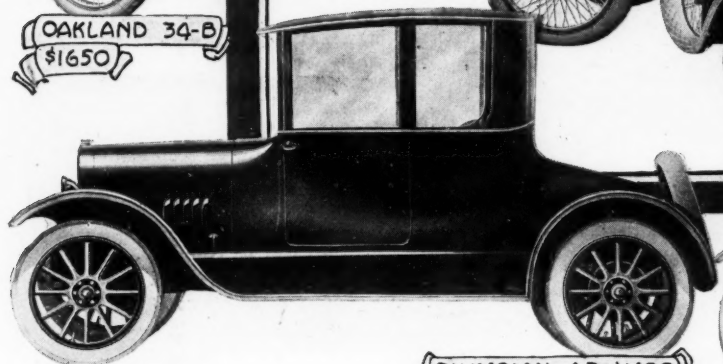
(HUPMOBILE R)
(\$2100)



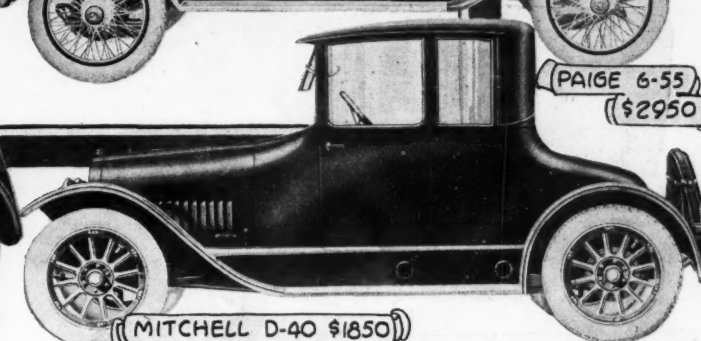
(OAKLAND 34-B)
(\$1650)



(PAIGE 6-55)
(\$2950)



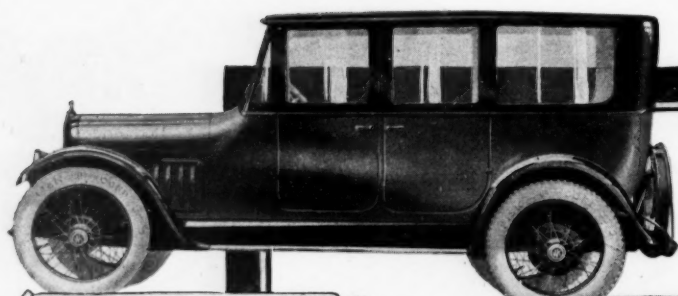
(OLYMPIAN 45 \$1490)



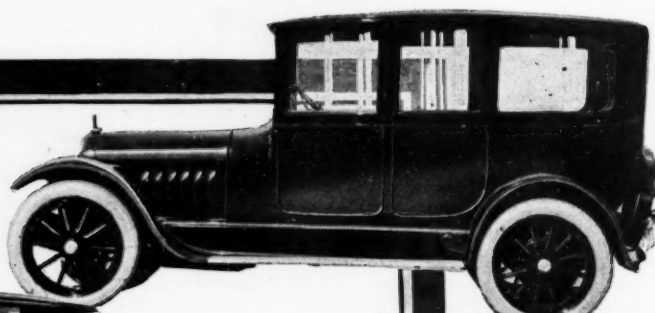
(MITCHELL D-40 \$1850)

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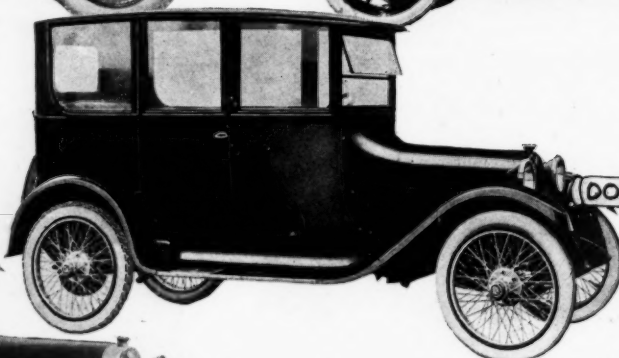
Sedans



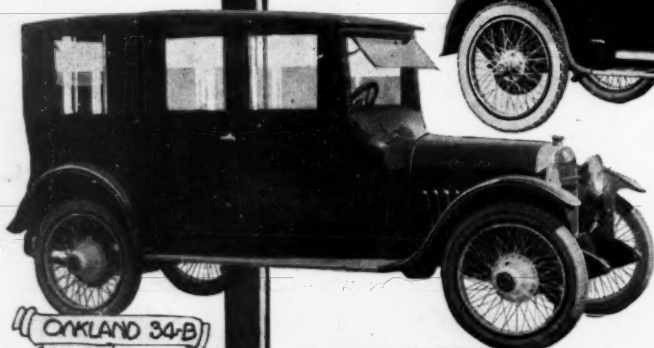
WILLYS-KNIGHT 88-B \$3475



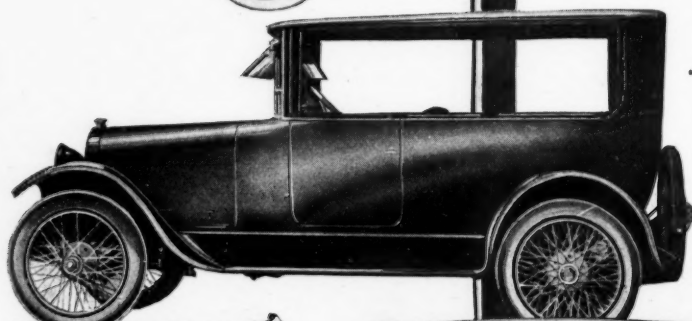
PEERLESS 56 \$3530



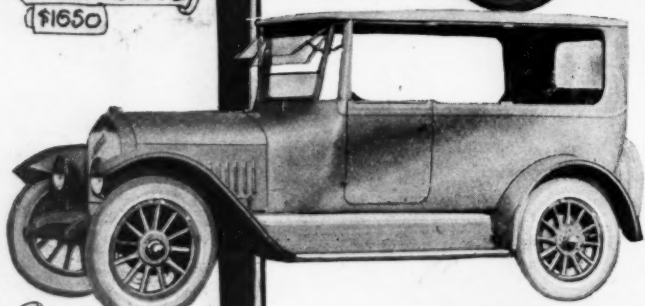
DODGE BROTHERS OPEN SEDAN
\$1650



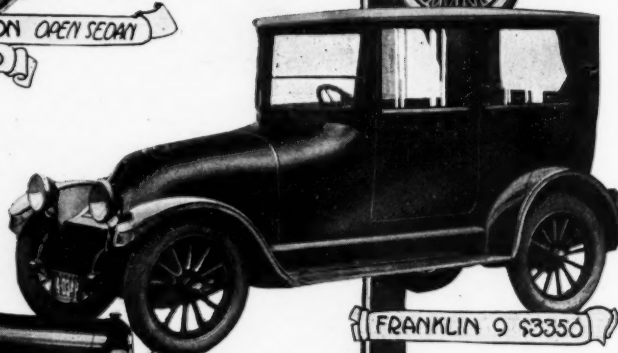
OKLAND 34-B
\$1650



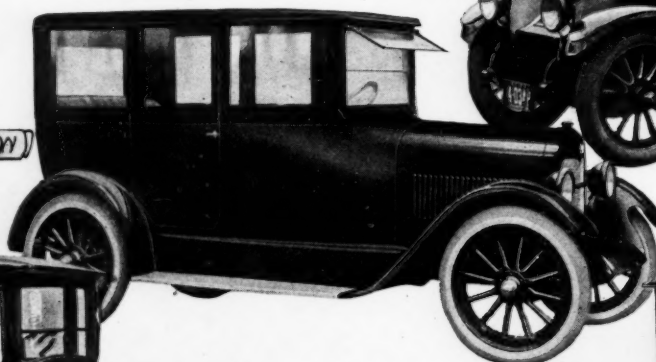
ANDERSON OPEN SEDAN
\$2550



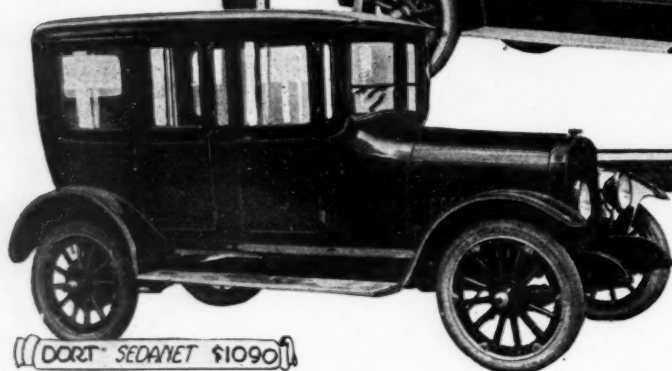
NATIONAL HIGHWAY SIX
OPEN SEDAN \$3120



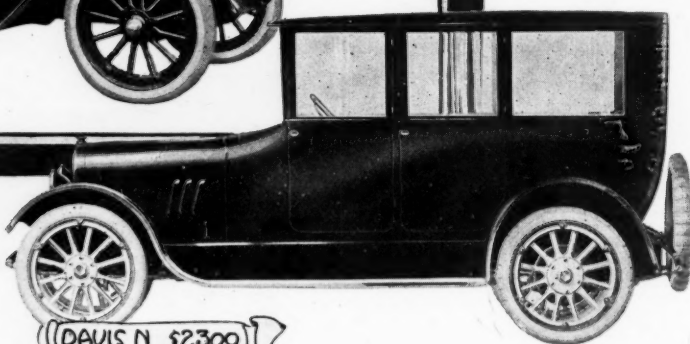
FRANKLIN 9 \$3350



ELGIN H OPEN SEDAN
\$1950



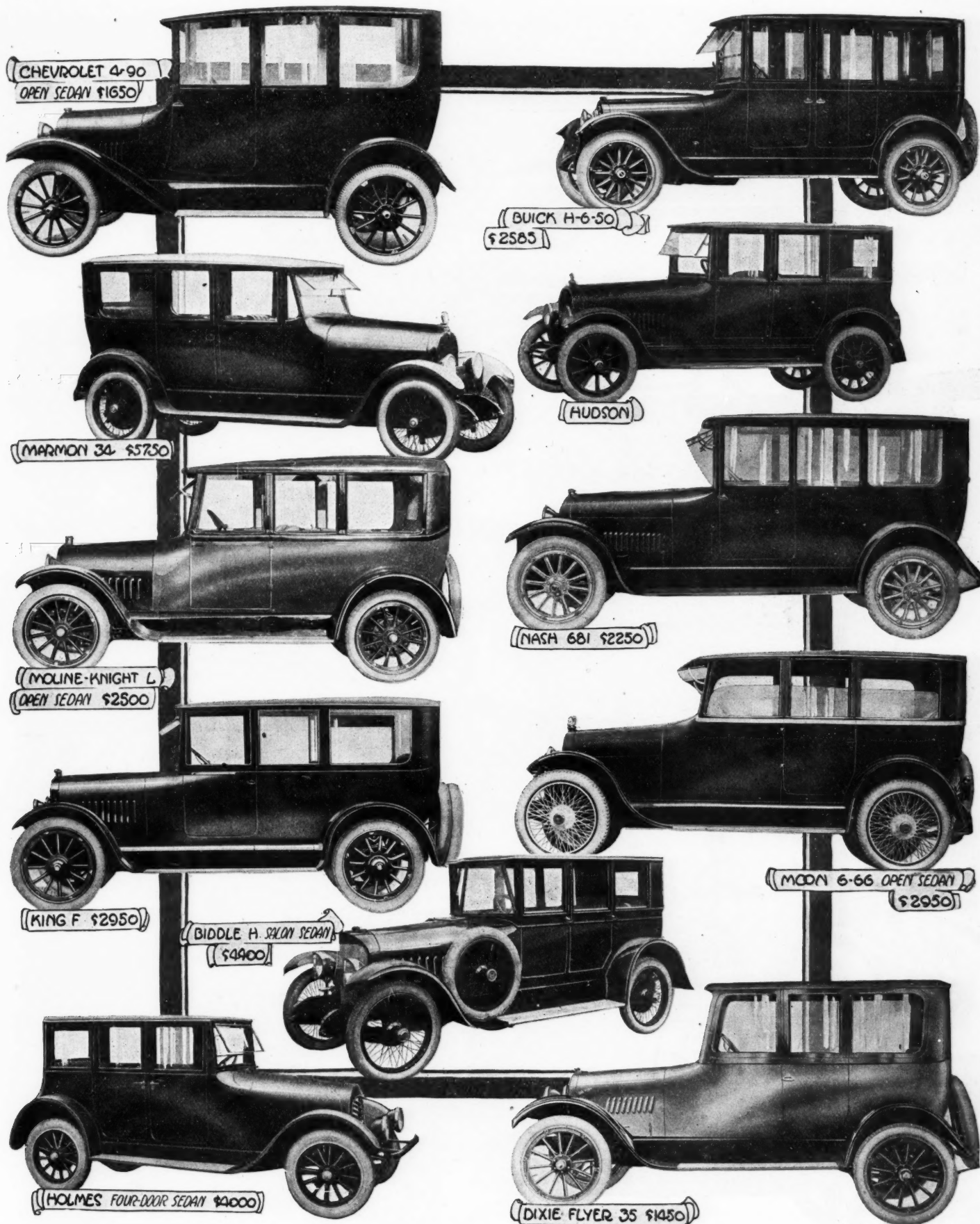
DORE SEDANET \$1090



DAVIS N \$2300

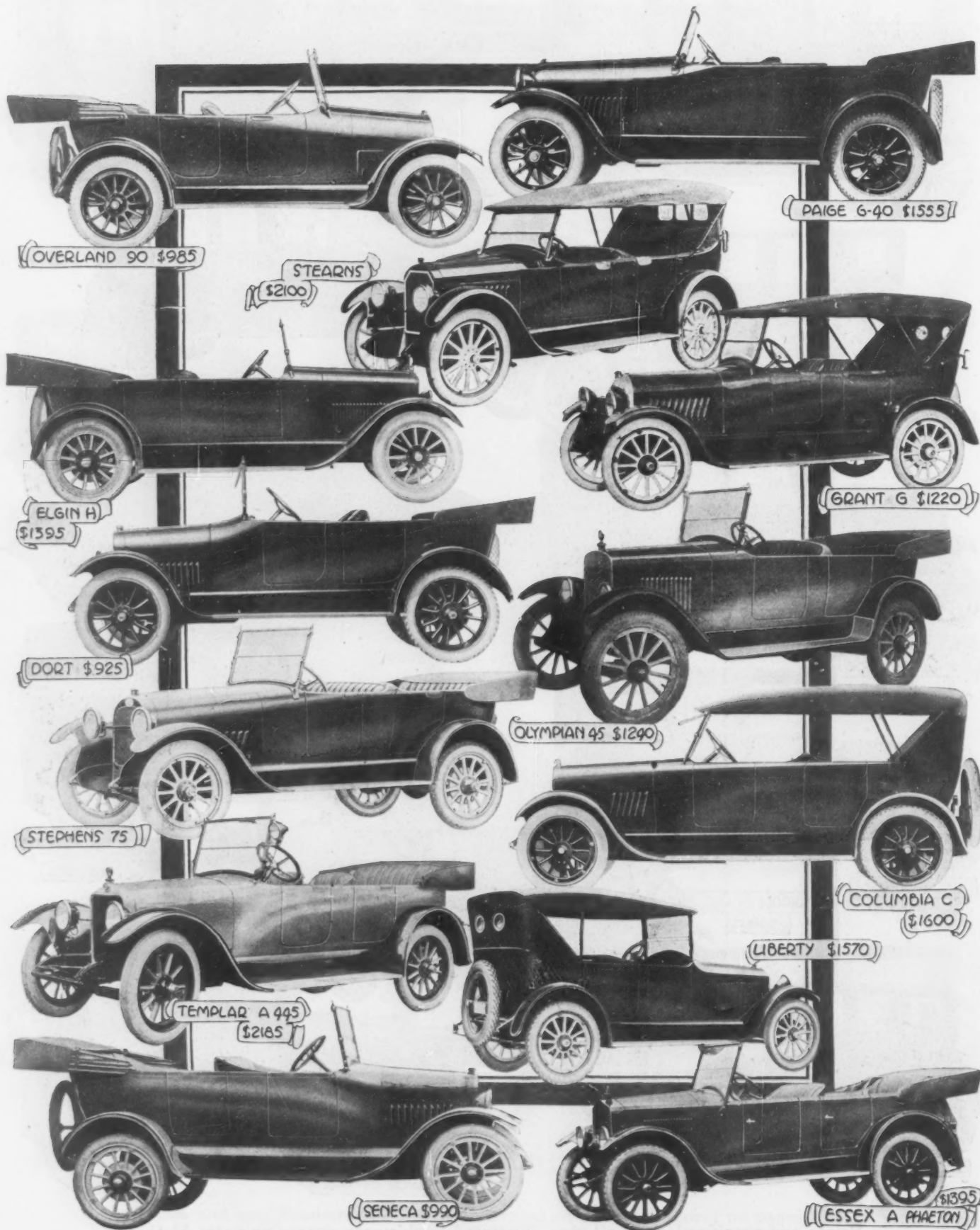
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Sedans



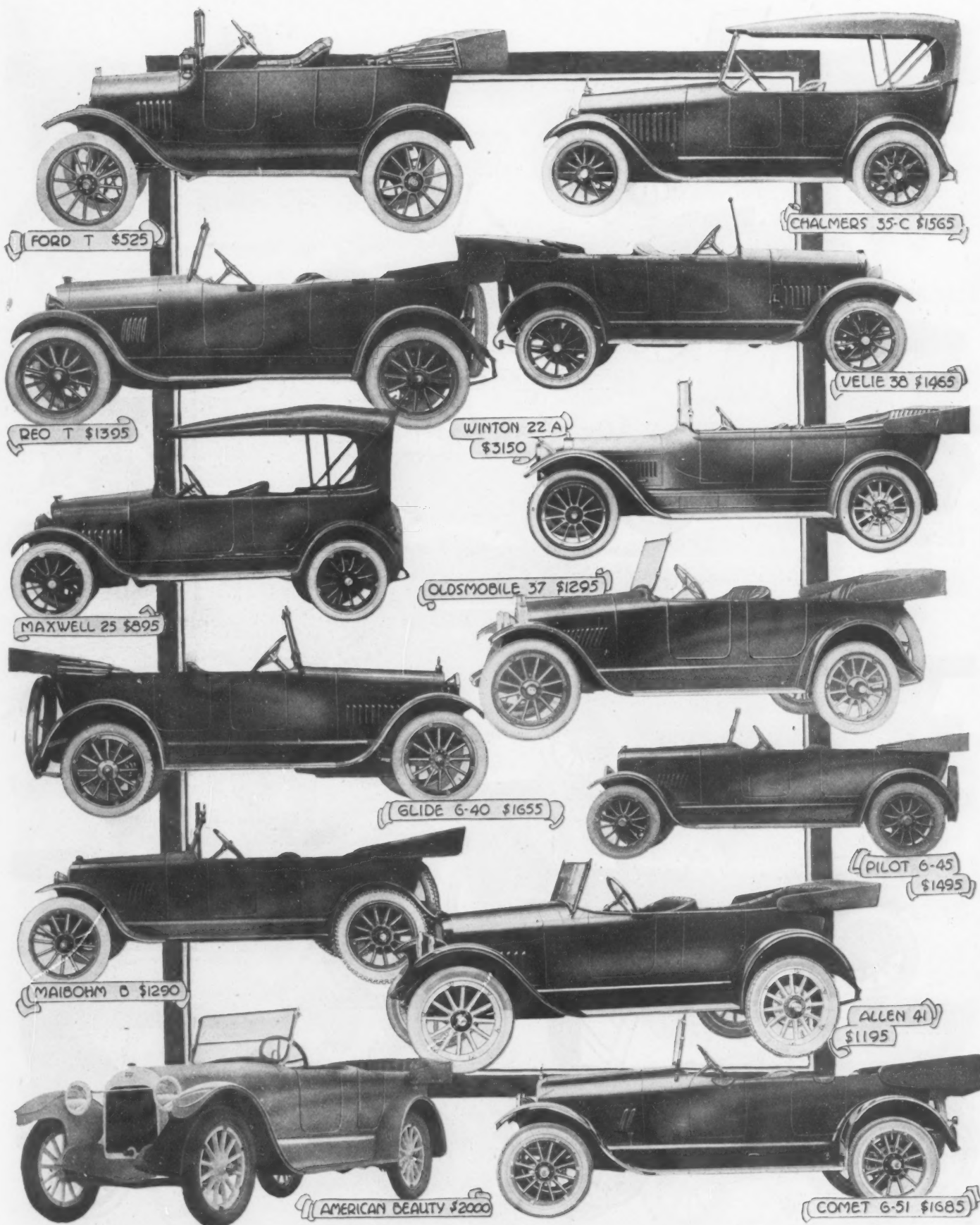
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Five-Passenger Touring Cars



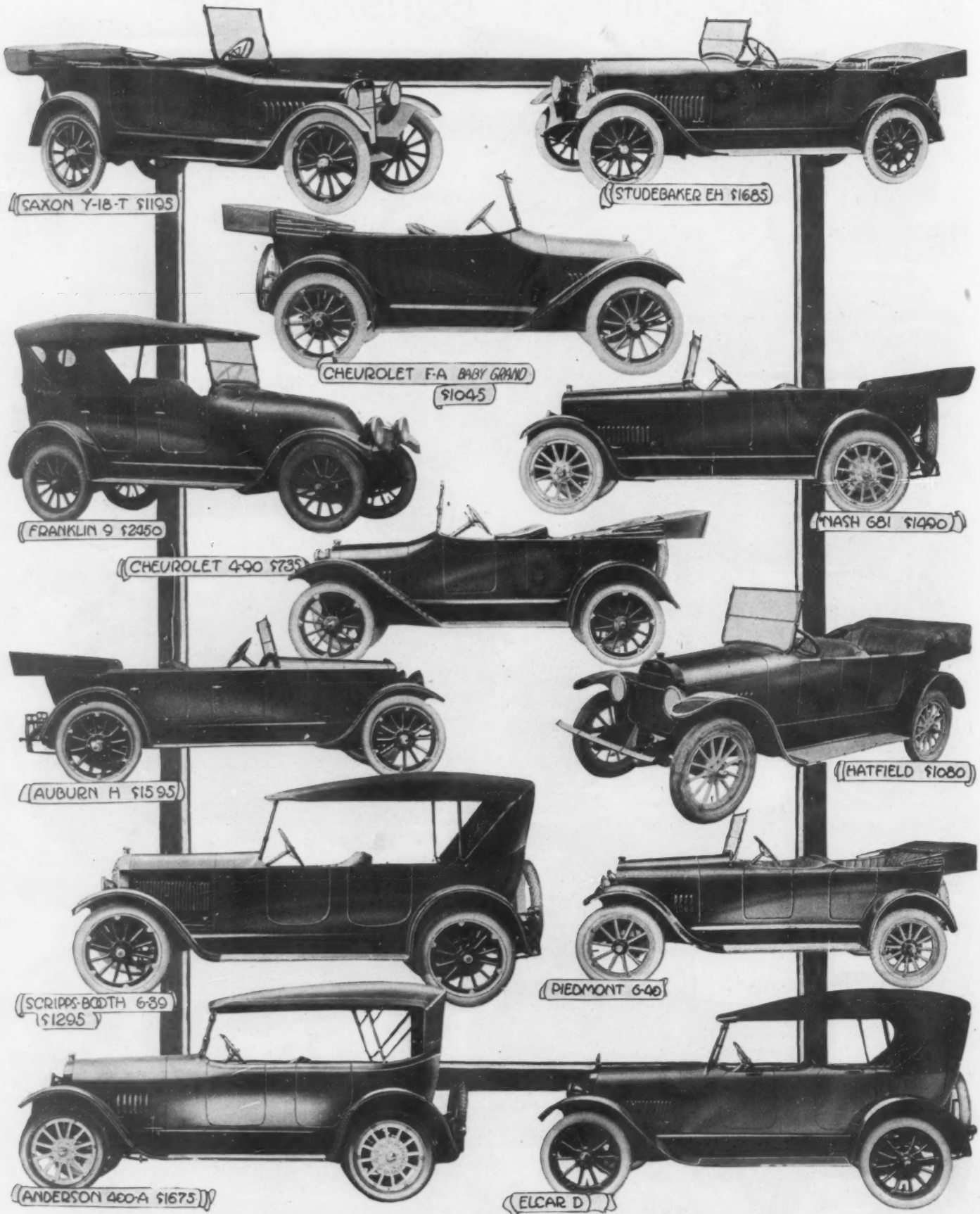
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Five-Passenger Touring Cars



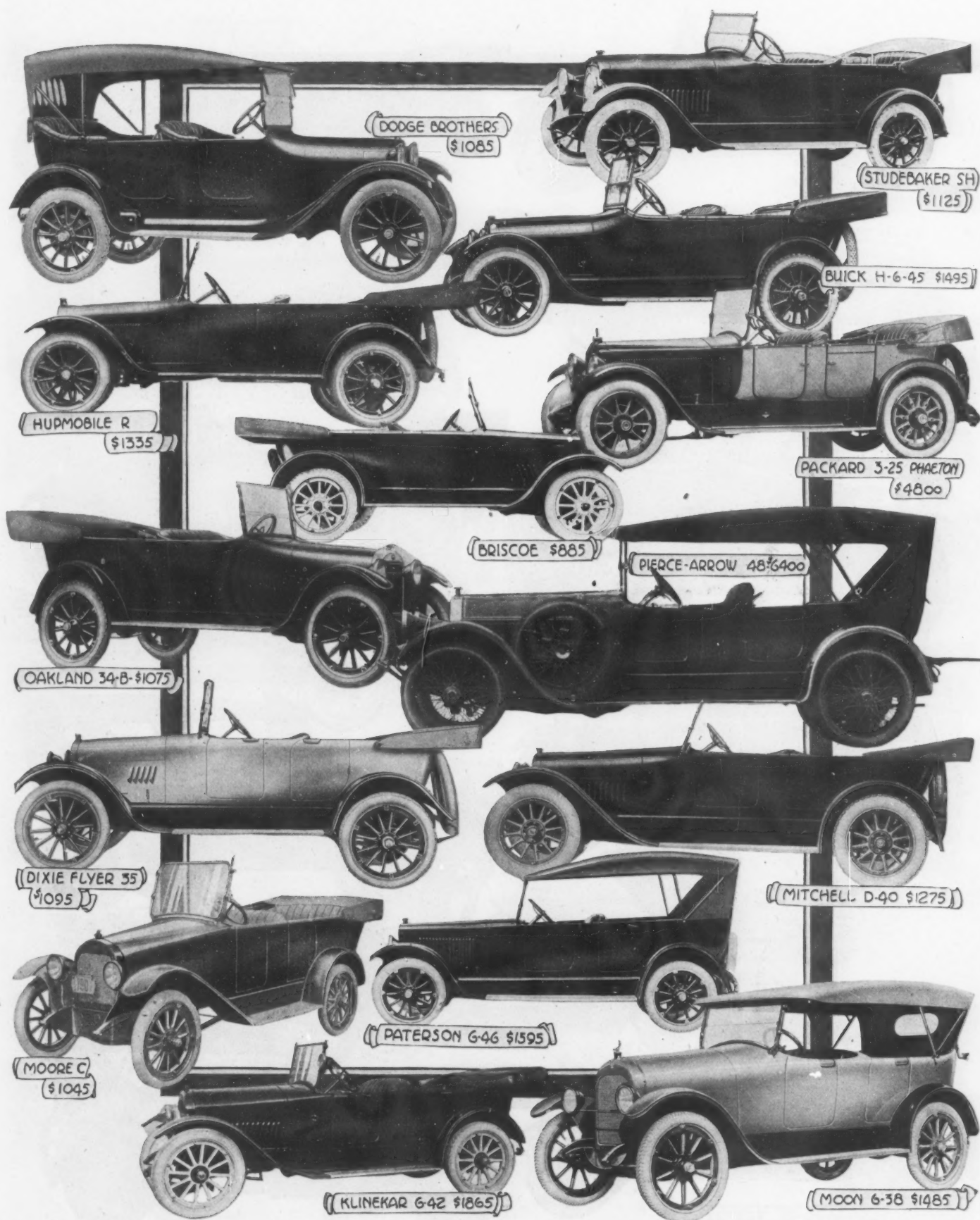
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Five-Passenger Touring Cars



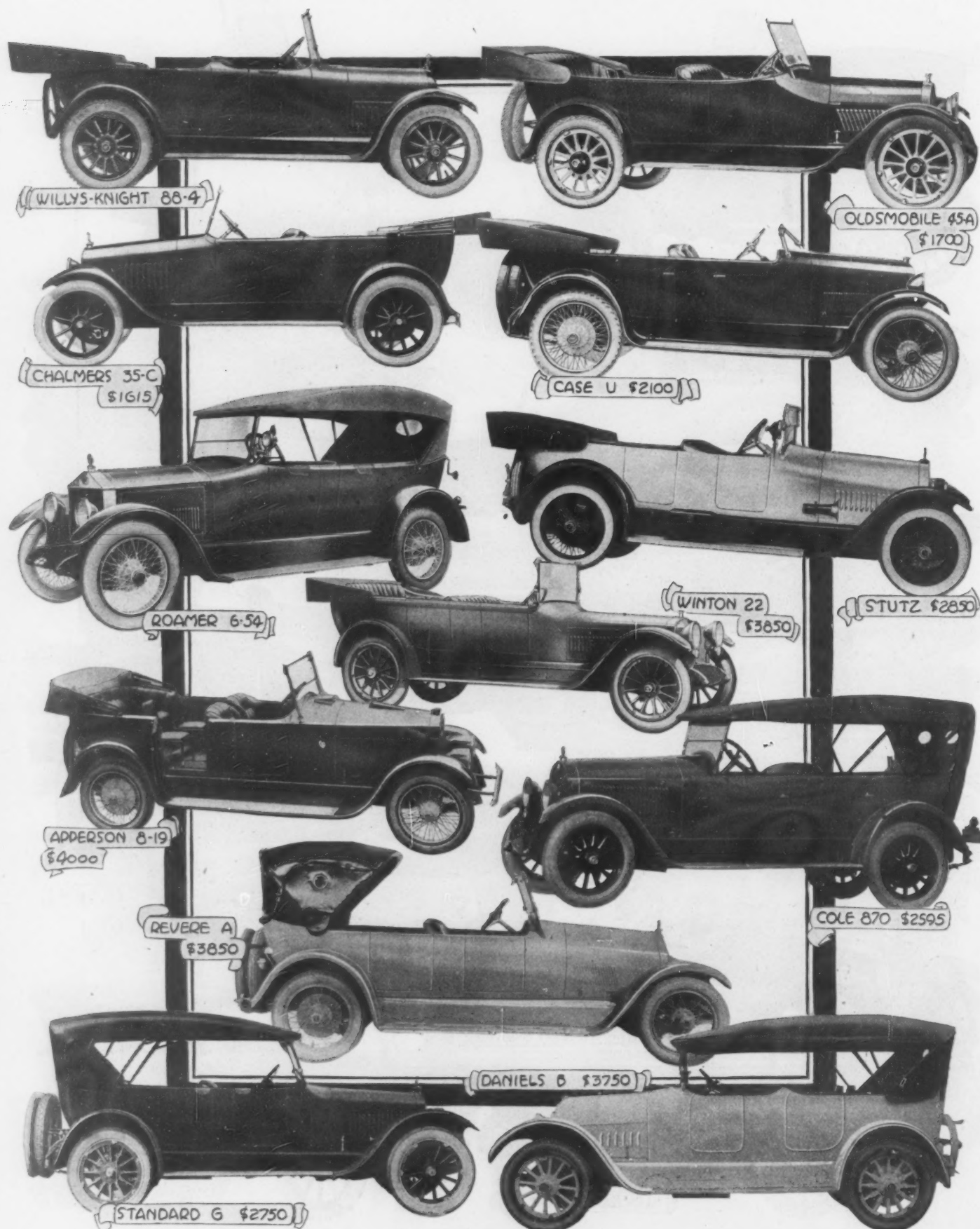
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Five-Passenger Touring Cars



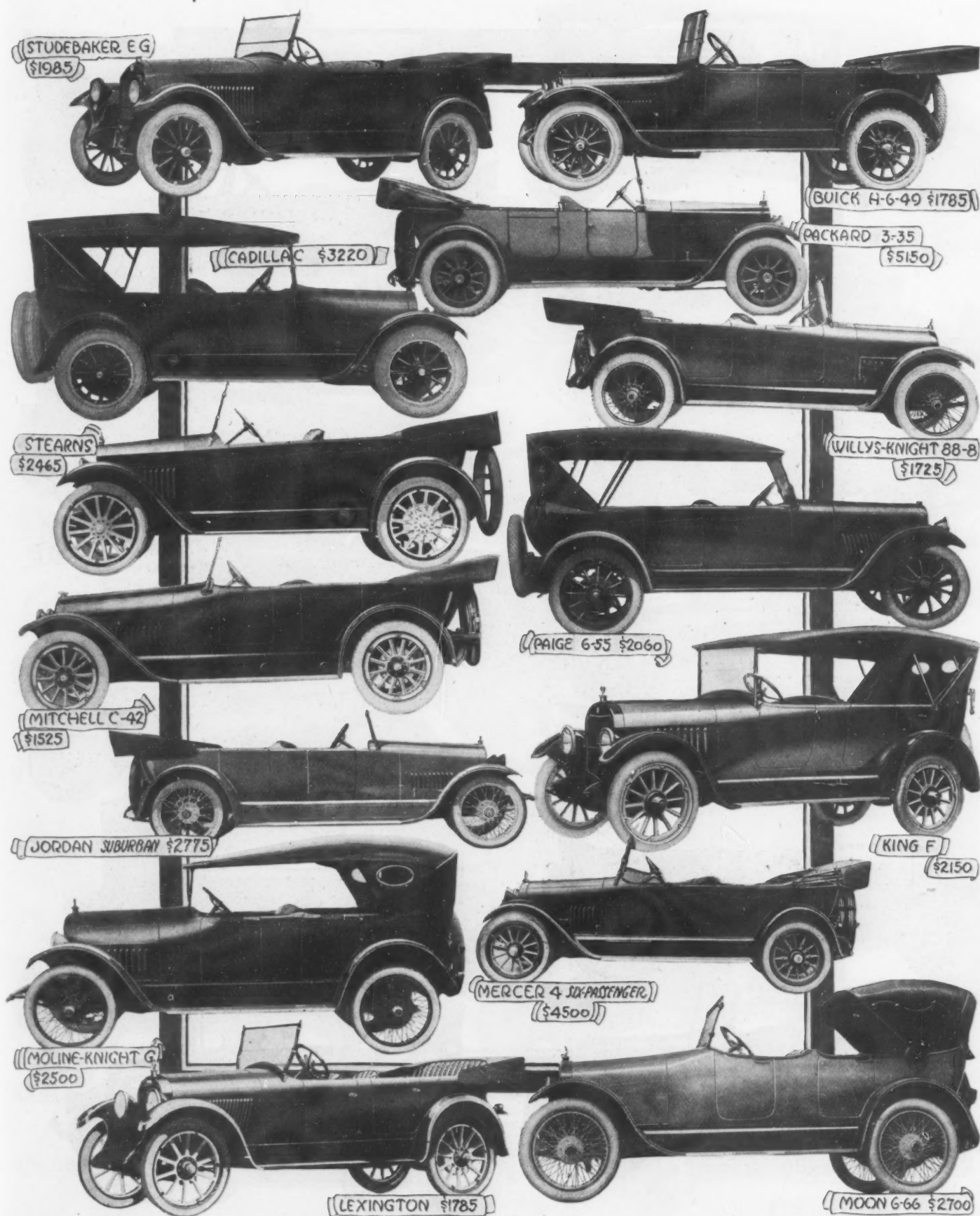
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Seven-Passenger Touring Cars



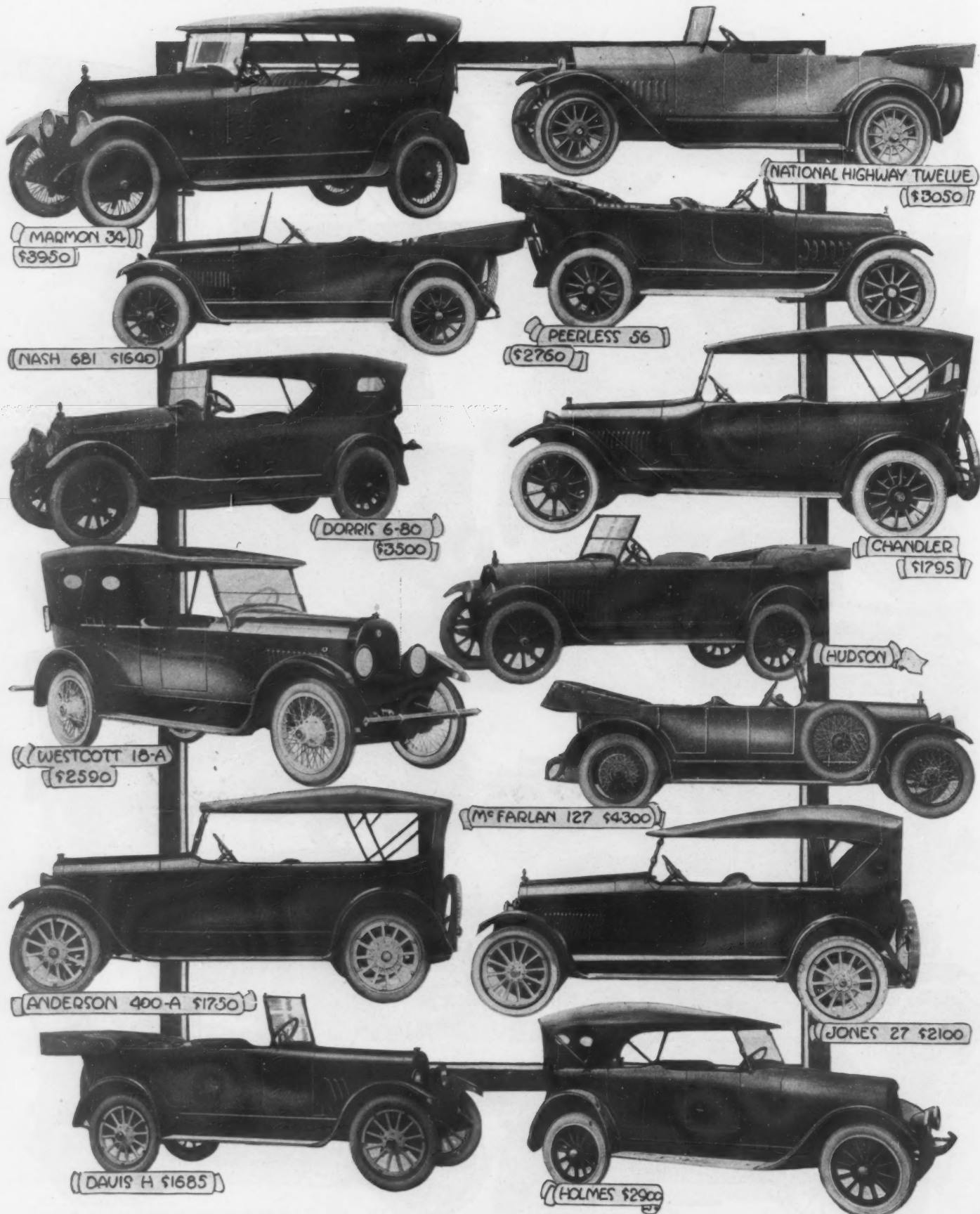
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Seven-Passenger Touring Cars



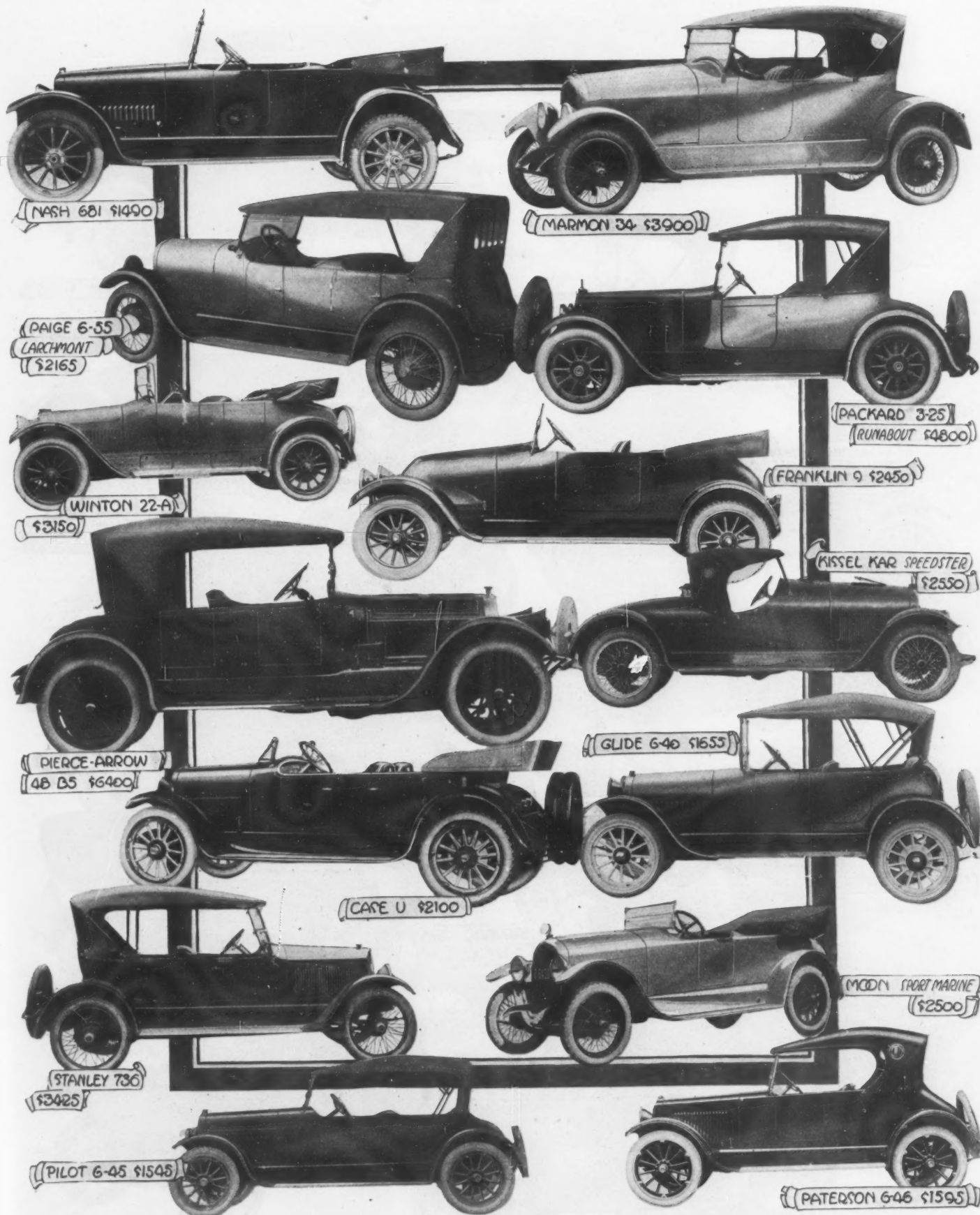
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Seven-Passenger Touring Cars



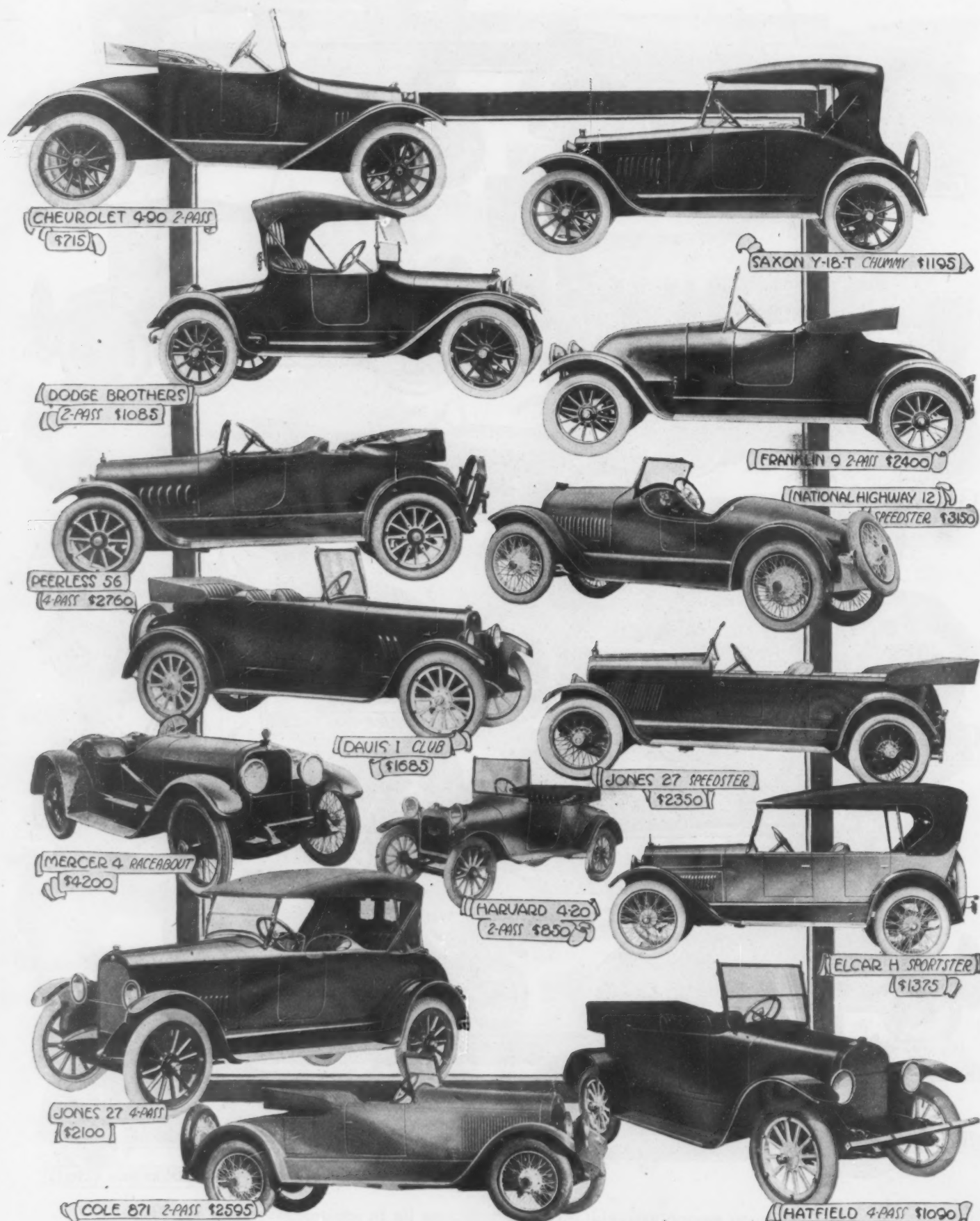
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Four-Passenger Roadsters



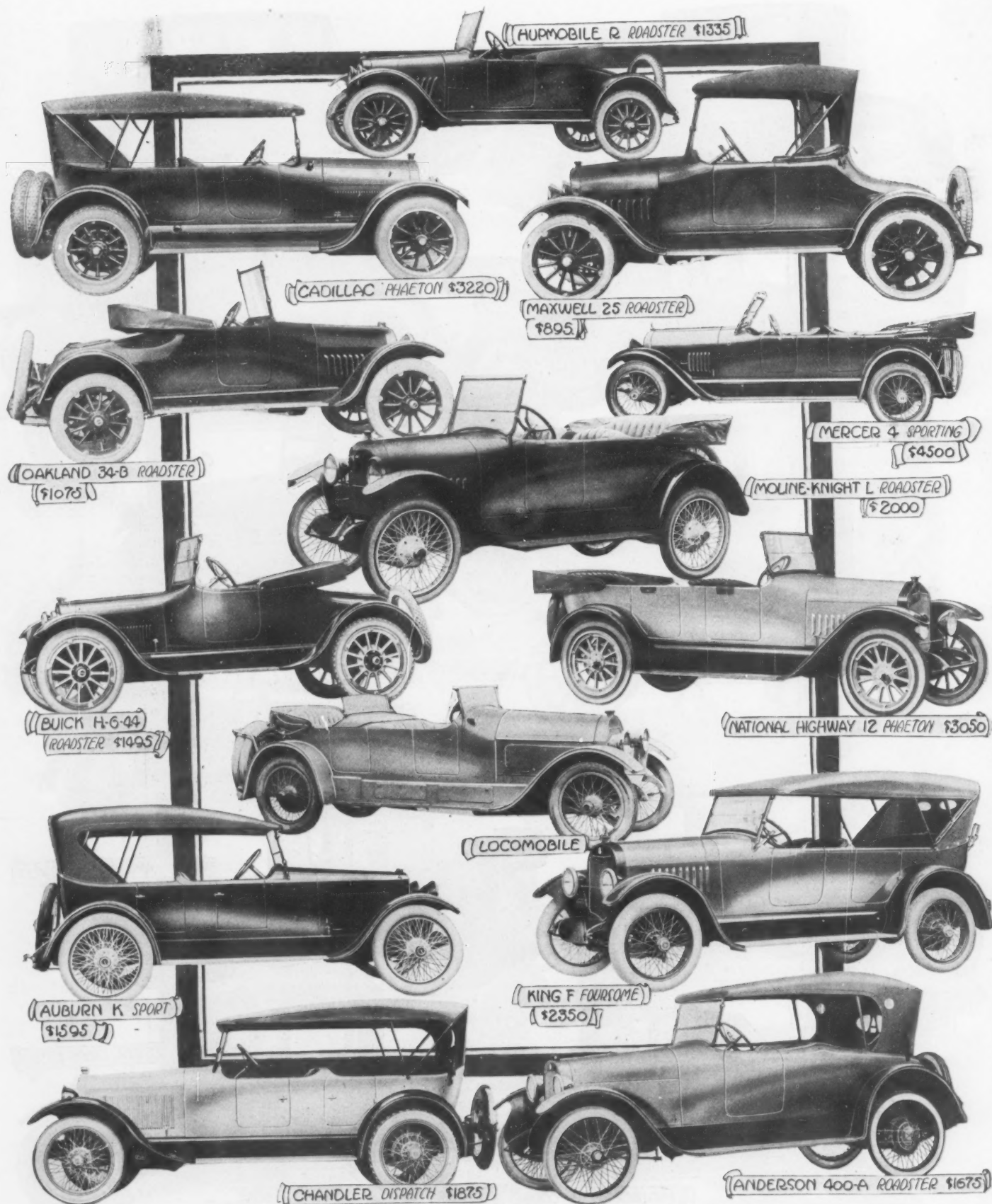
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Two- and Four-Passenger Roadsters



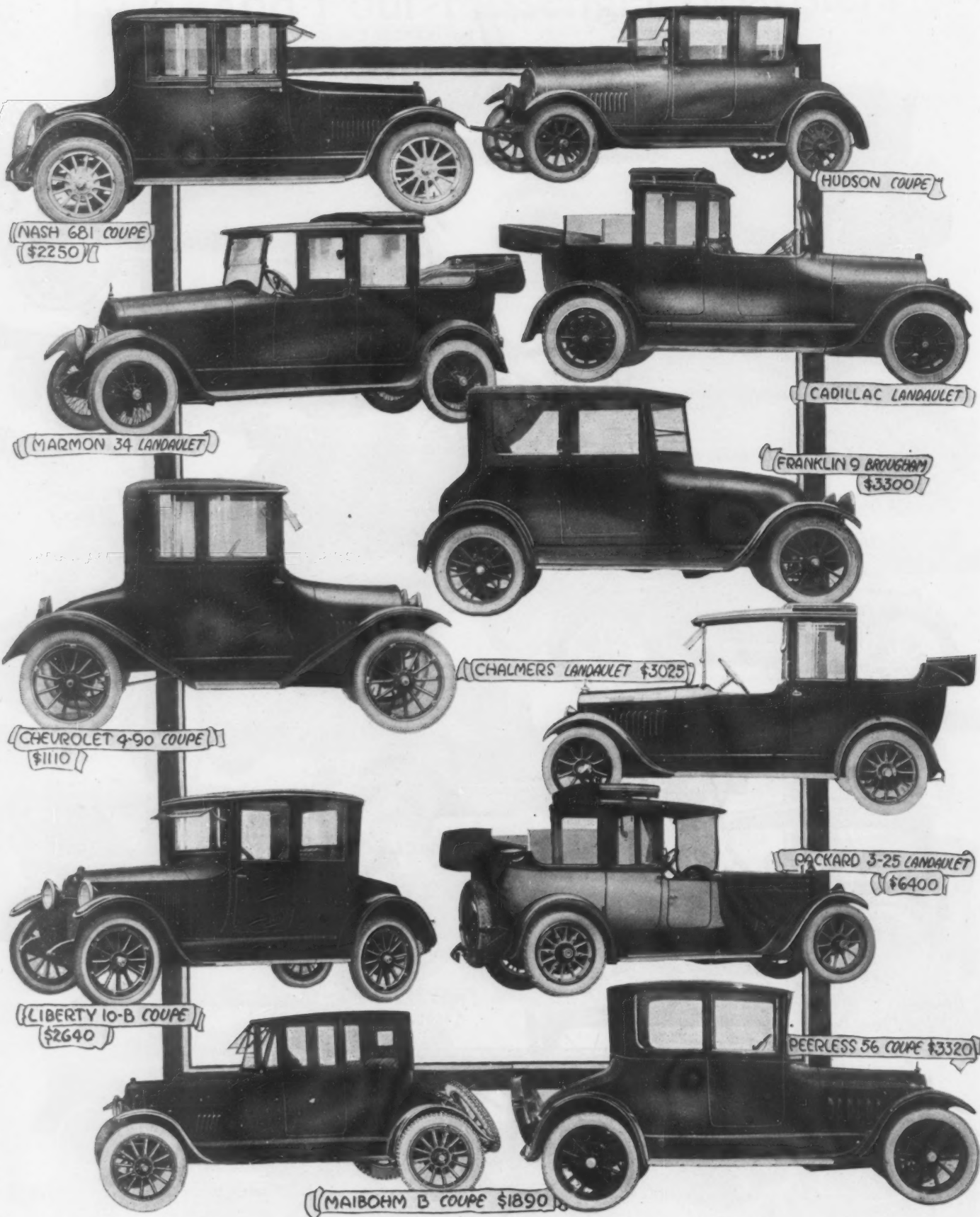
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Open Cars of Odd Capacities



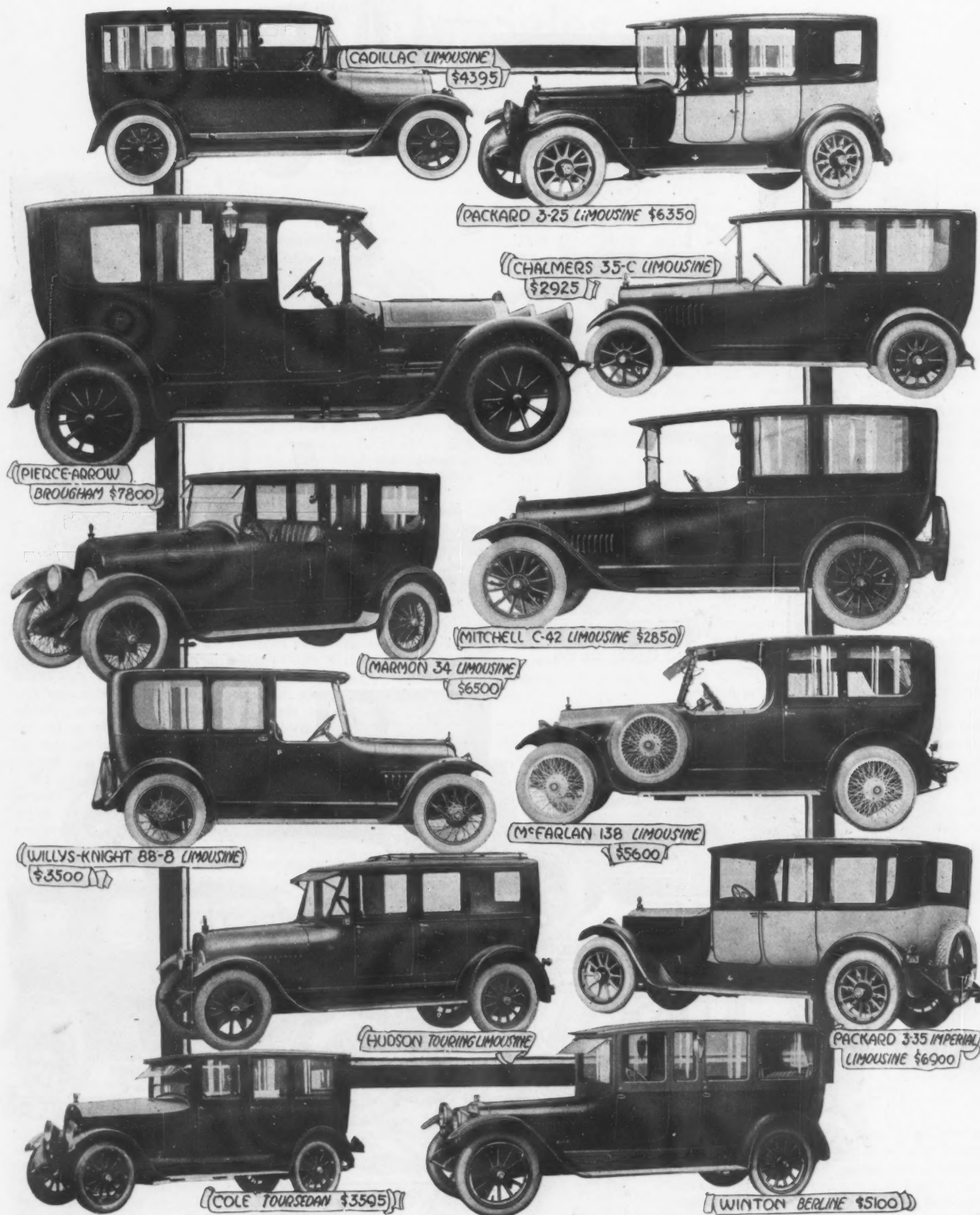
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Coupes and Laundelets



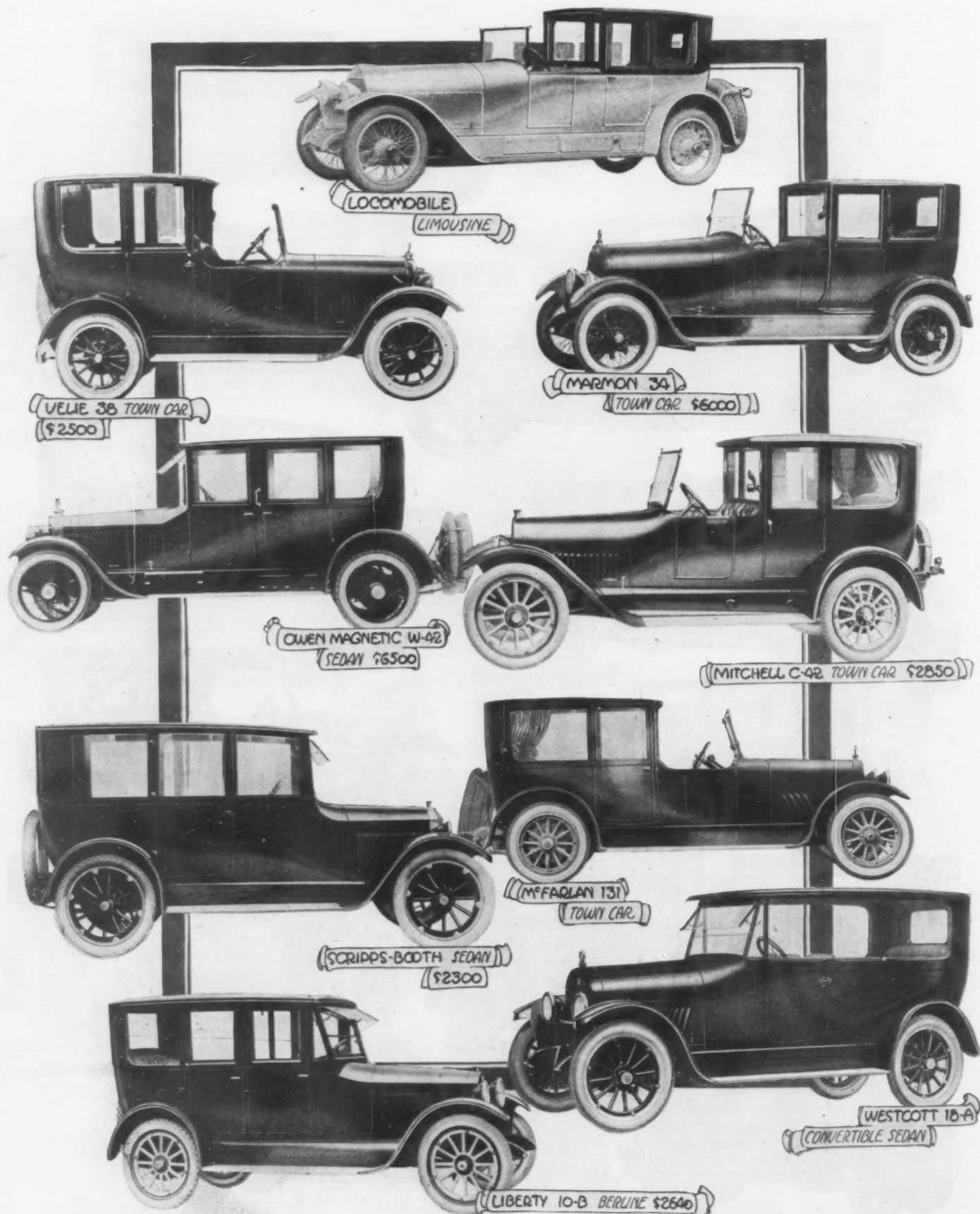
Prices and specifications of all cars illustrated on this page appear on pages 33-41

Limousines and Berlines



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Miscellaneous Closed Cars



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Optimism Paints Future For Sales

Heads of Selling Organizations Believe Prospects Bright for Live Dealers Who Seize Opportunity by Forelock

ANALYSIS of statements expressed by sales managers of some of the country's motor car manufacturers reveals a thread of optimism, not only as to the number of cars to be built and sold but better sales and service to go with them. Passenger cars, trucks and tractors have demonstrated their worth as a part in the national transport system and the general prosperity of the country means more automotive products will be sold than ever before, for the wealth per capita has increased noticeably since 1914.

The opinion is universal that production cannot keep demand with the supply, for it must be remembered that something like 750,000 to 1,000,000 cars were not placed in the hands of prospective owners last year—or built. Naturally there is the foreign market to supply, not only the immediate countries of Europe affected by the war, but Australia, South America and Asia. So far as the price is concerned, it seems that this is about stabilized up to July 1. Material and labor then will dictate whether prices shall go up or down. In most cases a reduction is prophesied, while on the other hand some concerns look for an increase as the result of better materials and im-

provements making the net manufacturing cost greater. Practically no change is expected for six months at least.

The used car will do much to relieve the shortage for the first six months of the year, and dealers are urged in some instances to devote their attention to this to July 1 in order that their stocks may be cleaned up before summer buying, when a brand new stock can be shown. The last year has shown a good profit to many dealers from the used car and, in view of the present predicted shortage of new cars, should mean even more this spring, at least up to the time when makers have resumed an output sufficiently large to meet domestic and foreign needs.

One of the problems of the distributor as seen by the factory sales managers is to build the man power of his selling organization and service department. Government training has produced some excellent timber in this line, and the aggressive dealers and distributors are the ones who will get the pick of men. Co-ordinating sales and service, with better co-operation between car maker and dealer, is going to do much to put the industry on a basis unheard of in pre-war days.

Demand for 1919 Will Be Normal, Says Willys- Overland

IT is our expectation that retail sales will immediately respond to the changed conditions. In fact, there are very generally indications of this now. We believe that with cars available for delivery, and with the addition of a proper number of salesmen to the forces which have been reduced during the war period, that retail sales will assume normal proportions.

We are of the opinion that opportunities in the retail passenger car business are going to be better in the next few years than at any previous time in the history of the motor car business. Our reason for this belief is that the passenger car has become thoroughly installed as a part of our national transportation system.

For a great many months now production has been curtailed, cars have been wearing out and normal replacements have not occurred. Then, again, the soldiers will be getting back into civilian life, and the market will be increased from this direction.

Prices, of course, will be controlled by the costs of material and labor. As yet there has been no reduction, and we are of the opinion that it will be some months before there will be any substantial reductions. We believe that abnormal demand and the increased amount of money which general conditions of the past few years have provided will fully offset the prices made necessary by the present high costs.

We expect that the demand for 1919 will be 100 per cent of our previous normal production. Of course it will take some time to attain this production, but inasmuch as it should steadily increase as the year advances,

we expect that the total for the year will equal the former highest average.

It would seem that export business can be expected to be particularly active. As a matter of fact, we believe that for a long time it will be regulated quite wholly by the ability to obtain shipping space. In general, we expect that the automobile business for the next two or three years will be one of the most prosperous in the country.—E. B. Jackson, Willys-Overland, Inc.

This is the side of the sales managers.
That of the dealers follows immediately after.



Develop Better Business Rather Than More Business, Mercer's View

THE demand for passenger cars is going to be good, but not quite as great as pre-war times. The summer demand will depend entirely upon the success of the business reconstruction program which is now under way.

The second-hand market ought to be active, as this source is more or less depleted at present.

Prices will remain essentially as they are for six months. Our present prices are guaranteed to May 1. The demand probably will be greater than the supply, owing to difficulties of putting production schedules back on normal basis.

Dealers can meet the situation by developing better business rather than more business and building up a competent sales and service organization.

Our message to dealers is the thought that co-operation and the community-interest spirit are better than the go-as-you-please plan and price-cutting methods which prevailed in many sections previously.—W. A. Smith, Mercer Automobile Co.

Reo Sees 150 Per Cent Demand to Fill

THERE seems to be a slight apprehension among a certain class of distributors and dealers as to the demand for passenger cars during the coming spring and early summer. While the percentage is infinitely small, nevertheless from a manufacturer's standpoint it is a problem with which every sales department must cope for the next

three months, after which the potential demand will manifest itself sufficiently to absolutely destroy this pessimistic feeling.

How anyone closely allied with the motor car industry can predict anything but an insatiable demand for both passenger cars and commercial vehicles this year, as well as several years to follow, is difficult to understand. There are few—and very few at that—fundamental factors which really determine the marketing possibilities of any commodity which is as utilitarian as either an automobile or truck. A comparison of the net present worth and the annual per capita income for 1914 and 1918 should dissipate any feeling of uncertainty as to the sales possibilities for the coming year, for the demand for either passenger cars or trucks will always be in direct proportion to the income of either the nation or the individual.

Production figures for 1918 will show a decrease of nearly 1,000,000 units, compared to the preceding year, and there never was a year in the history of this country in which so much wealth was created as in the one just passed. Thus it is proven that the production of 1919, which cannot possibly equal 1917, will have to care for approximately 50 per cent of last year's demand in addition to its own.

This year will mark a new era in the automobile industry, and it offers alike to the manufacturer, distributor and dealer an opportunity to eliminate many of the abuses and handicaps which it has been impossible to do before.

Service Problem Foremost

Foremost among these was the service problem in its various forms. In the early days of the industry, when sales were few and bugs as plentiful as cooties in a dugout, the public were educated to regard the word "service" as conveying a vastly different meaning than the interpretation given by Webster. The war has forced the dealer to modify his service policy and now is the opportune time to make permanent what was originally intended as only an expedient.

An efficiently managed service station can satisfy at least 95 per cent of its owners and still show a small balance on the right side, if the retailer will only take advantage of the present situation and adopt a policy which will give the owner the service to which he is entitled and at the same time insure at least an even break for himself.

Another curse which is again liable to manifest itself is price-cutting. While its practice has spelled ruin for a good many dealers in times past, it is never going to be entirely dispensed with until three things have been accomplished.

First, the dealer must recognize that the manufacturer does not establish a list price which gives the dealer a gross profit larger than is necessary to maintain a first-class salesroom and service station and a net profit that is commensurate with his investment and efforts.

Second, the dealer must establish a cost system of some sort. This, even though it be a crude one, will reveal the business disaster which will be the culmination of such.

Third, the elimination of the curbstoner. It is with this class that price-cutting originated. This situation can best be dealt with through strong local dealers' organizations and a constant campaign among salesmen to educate the buying public on the many ad-

vantages to be had from purchasing from the legitimate dealer rather than from one who is looking for nothing more or less than immediate profit, who has nothing invested in his business and, therefore, is of little, if any, benefit to the community from whom he is trying to eke out a living and give virtually nothing in return.

Prices are certain to maintain their present level for a good many months to come. Wages cannot be reduced until the high cost of living is defeated, and this is impossible until both agricultural and fabricated products are cheaper. The latest prices announced for the basic metals and their various alloys, which constitute the major portion of a motor vehicle, represent reductions of from \$3 to \$8 per ton. The possible influence of such a reduction on the selling price of an automobile would be negligible.

As previously indicated, the wealth of this country has increased several billion dollars since 1914 and with practically no immigration. It has given the per capita wealth a big boost. Thus it becomes obvious that it will be at least several years before we see the purchasing power of a dollar back to its pre-war status. For the benefit of all individual activity and the country as a whole, may it be postponed as long as possible. While the signing of the peace treaty is months ahead, already there are indications that its terms are going to place the United States in a dominating position in the world of commerce.

Today we practically control the money market of the world. This, together with a merchant marine that will be superior to that of any other nation, insures our future commercial supremacy and upon that supremacy is based our domestic prosperity. The period of readjustment now on will be comparatively short, after which this country and the automobile industry, in particular, will enjoy an age of prosperity, the equal of which was never hoped for by our most optimistic dreamers.—F. H. Akers, Reo Motor Car Co.

Future Bright for Live Dealers, Says Velie

WE have recently sent out to our dealers a letter stating plainly our ideas regarding the supply and demand for automobiles and trucks during the next six to eight months, and I believe that we can best reply to your questions by giving you a digest of this dealer's letter.

There is no question in my mind but that the demand for automobiles this year will exceed the year 1916-17. Generally speaking, dealers' organizations are practically

intact. While there have been some minor changes and some of these smaller dealers have dropped out during the war, the large majority of the good distributors have weathered the storm and are now in position again to take up distribution on a large scale.

Foreign trade this year will assume large proportions. In England, France, Germany and other countries practically no passenger automobiles have been produced for the last three or four years and every available motor car has been used and practically worn out so that from these countries there will be a large demand for American-made cars.

On account of the lack of ocean transportation during the war, it has been impossible with a few exceptions to ship automobiles to any foreign markets. This means a foreign demand far more than normal from practically the whole world. In our own case, for instance, at the time the war broke out we had agencies established in nearly all of the foreign countries. Of course, during the war we were able to make but few shipments, but now that the war is ended almost without exception these agencies have all been re-established and are already making demands upon us for a large number of cars.

Big Business Prospects

Conditions at home seem favorable for a large business. Generally speaking, the entire country is prosperous. The eastern manufacturers have made good profits from war work; cotton has brought extremely high prices in the south and southwest; the middle west and western farmers have made more money this year than ever before in their history. For example, during this past year the average income from every farm in the state of Iowa was nearly \$9,000 per farm. The Pacific Coast on account of shipbuilding and timber products is in an enviable position. Therefore, unless unforeseen adverse business conditions arise there should be a very large demand for automobiles, trucks and tractors.

The price question, which has been to some extent a disturbing factor, is now settled. We ourselves and practically all other manufacturers have announced prices and agreed to maintain these prices in most cases until July 1 next. Furthermore, the cost of labor and material will not legitimately permit further reduction in prices for some time to come. Therefore, I feel that the price situation has been stabilized for practically the balance of this automobile season.

Regarding the ability of manufacturers to supply automobiles, trucks and tractors during the next six to eight months, I am convinced that it will not be possible for manufacturers to build all the motor product that can be sold. We still have to complete a large amount of Government contracts, and as far as I can learn practically all of the larger automobile concerns of the country are in the same position. This, then, will require a portion of our capacity and capacity of other manufacturers for the next three or four months. This applies not only to manufacturers of completed cars, but also to the parts makers, accessory makers, etc.

This, with the fact that in the past twelve to eighteen months production of automobiles in this country has been very materially decreased, and that all surplus of finished product and raw material has during this time been practically exhausted, in-



dicates to me that automobile manufacturers in general will be unable for many months to come to get back to a normal production, and that clearly there will be a larger demand for automobiles than can possibly be filled. This means a shortage of cars.

To briefly summarize the meaning of all this, Government contracts yet to be completed, shortage of raw material and finished units entering into the construction of automobiles will continue for some time to limit the production of passenger cars to approximately 50 to 60 per cent of normal. The increase of foreign trade, the general prosperity of the entire country, the stabilizing of the price situation will create a demand far above normal; therefore, decreased production and increased demand mean a big shortage of automobiles, and *my advice to every dealer and distributor is to put in storage during the winter months as many cars as can be consistently handled, for I predict that these cars will be a valuable asset when spring comes.*

Finally, my message to the dealers of the country is one of optimism. The war is ended and our country has done its part and done it well, and we are all more than proud of the boys who have gone across and things which they accomplished and of those who have stayed at home and the work they have done. Yet in comparison with the losses of our allies and those of our enemies this country has suffered but little, so that today we return to a peace basis with our industries intact and with a major portion of the wealth of the entire world at our command. Under these conditions business must be not only good but larger and better than ever before. Therefore, it seems to me that *each dealer's share in this prosperity, which is at our door, will be commensurate with the ability and aggressive effort which that dealer puts forth to secure his portion.*

—F. E. Bradfield, Velie Motors Corp.

Practically Every Human Wants a Car, Says Stephens

FROM present information available with regard to probable production in all manufacturing lines, condition of crops and the probable demand for labor, I am very optimistic about the sales possibilities for new passenger cars this coming spring.

Just at this time there is the lull in business that was to be expected in changing back from a war to a peace-time basis, but as rapidly as possible the manufacturer is getting in material and making the necessary changes to resume the manufacture of passenger cars on a peace-time basis. As fast as this work can be done and plans made which will put the distributor and dealer in possession of the necessary information, sales effort will increase, and with sales effort increased it will be a mighty short time until new passenger cars will be selling everywhere.

Trucks have so demonstrated their utility in the rush of war work which had to be cared for that they are going to receive more of the thoughtful consideration of manufacturers and business men than they have been able to command in the past. This will



enable the truck manufacturers to develop better selling methods, and 1919 should be in point of sales the beginning of a new era in the motor truck business.

The tractor business will develop in direct proportion to the effort made on the part of the tractor manufacturers to educate the farmer concerning the value of the tractor as a part of his farm equipment. Whenever the farmer is convinced that he can safely turn to power farming and gain for himself the advantage of more work in shorter hours the demand for tractors will be greater than the factory capacity at present in sight in this country.

It is natural to assume that the demand for passenger automobiles will increase with the coming of summer, and especially will this be true if the present agitation for more good roads and better maintenance of roads is unabated.

With regard to the price at which automobiles will be sold. Present information would indicate that there can be no decline for at least four to six months. There are so many angles to the material situation that I do not feel any individual can at this time predict with any degree of accuracy what may be expected with regard to the material market. However, it is to be hoped for the benefit of business in general that any decline in the price of raw material will come slowly as the result of peace development.

With regard to production of new cars keeping pace with the demand. I do not believe this is possible, both because of the fact that material is not going to be available in quantities sufficient to increase production rapidly and because of the fact that the production of new cars in 1918 was 800,000 short of normal.

How to Improve Chances

Distributors and dealers of passenger cars can improve their opportunities by raising the quality of their selling organization, by eliminating the old haphazard way of doing business and organizing their sales department on an efficiency basis; and the manufacturer of passenger automobiles is going to give this more and more attention and give the dealer greater help along this line than has ever been available.

Dealers' problems will be along the lines of finding efficient salesmen, compiling for the use of these salesmen the necessary information both with regard to general business conditions in the United States, business conditions in their own territory and the material situation which will control output.

The large amount of work done as a result of the war along the lines of standardized service is going to be of wonderful benefit to the motor car dealers, and the result of experience with standardized service policy is going to be of unlimited benefit if the dealer will avail himself of this experience.

The second-hand car market is in better shape at present than it has been for several years, and if the dealers throughout the country will profit by the experience of the past year the second-hand car proposition will never again be a problem. The last year has proven that there is a market for good used cars and has shown the dealers the way to handle this business at a profit.

Indications are that general business conditions will be good, and we have every confidence that business in general is going to get back to a peace basis rapidly and that by concerted effort on the part of all business interests we shall have bigger and better business generally than we have had for the past several years.

My message to the distributors and dealers of the country is:

Organize your business on a thorough basis.

Wipe from the slate all thought of and reference to the motor car business as a game.

Surround yourself with the kind of help that can consider the business as THE business and as the best business of them all.

Remember also, that practically every human being wants an automobile.

Consider the car you sell. Is it adaptable to the needs and wants of the individuals in your territory? In short analyze the sales possibilities in your locality.

Cut out the unprofitable labor and build your business along the lines of permanency.—E. Roy Clough, Stephens Motor Branch.

Service of Paramount Importance, Says Haynes

THE spring demand for new passenger cars is bound to be great and no doubt will exceed the supply, and the same opinion will apply to the demand throughout a portion of the 1919 season. But undoubtedly as the factories get under production they perhaps will catch up a certain percentage in May and June, but I do not anticipate that they will reach their normal production prior to July 1 next.

The second-hand car market should be, also, a very remunerative department in every dealer's business, due to the fact that during the shortage of production of new cars it gave the dealers an opportunity of disposing of practically all of their used machines. They are, therefore, open to more trades, and the successful dealer who has traded wisely should find no difficulty in marketing his second-hand, or used, cars.

The price situation is a very much discussed question at the present time. Insofar as this organization is concerned, however, we do not expect to make any reduction in the list price of our cars, while, upon the other hand, it is our intention to increase the list price for the 1919 season.

The real dealer problems for the coming season are perhaps much greater than for a great many years heretofore. He must build

up his organization throughout, as no doubt he has lost a number of his very valuable employees in all departments, and it will require a great deal of time, money and patience to replace these people. The matter and question of the selling price of a dealer's line of cars will be a great bone of contention, no doubt, to all prospects, provided his car might happen to list at a price slightly in advance of that of some competitor, or the explaining of why some factory saw fit to reduce its prices and some other factory saw fit to increase its prices.

From our standpoint, we cannot see the consistency of any reduction in the price of automobiles at the present time. It is not logical, by reason of the fact that the price of labor and automobile materials has not been reduced. We are not burdened with an overstock of Haynes cars. Our dealers have no accumulated stock on hand, and from a business point of view we cannot see any logical reason for any reduction until general conditions are correspondingly changed.

We purchased a great deal of material at wartime prices, which we are still using. Our factory payrolls have not been reduced and, therefore, we believe our argument is a sound one. The dealers should feel their way along cautiously, conforming their policies to conditions as nearly as possible, or until our business affairs have reached a point somewhere around normal.

The matter of service is paramount to the importance of the sales. So many of our higher-class mechanics have been in the service that many of the owners' cars have been neglected, and upon the return of these mechanical men the owners will present their cars to the various service stations for attention and the dealers will find this a very profitable department of their business. They should place immediate orders for a goodly stock of repair parts and generally organize that department for a big business.

The general business conditions throughout the country in our opinion are very good; they will be much better, and the coming three years, the writer anticipates, will be very profitable to the automobile industry in general, which is the big message we have for the dealers of this country as a whole.—S. M. How, Haynes Automobile Co.

Cole Expects Phenomenal Selling Season

IT appears to us that business is going to open up immediately. Throughout the country we have noticed an increase in de-

mand for new passenger cars since about two weeks after the signing of the armistice.

For a time there seemed to be a great deal of doubt in the buyers' minds as to what would happen to the prices, but since we ran our announcement ad, notifying the public that we were going to restore our normal prices and increase our production 100 per cent, we have noticed the continually increasing demand for cars and increasing activities of all our dealers.

As the year progresses we feel the demand for cars will increase steadily, and we think that the summer of 1919 is going to be one of the most phenomenal selling seasons that we have as yet experienced.

During the first six months of the year there is going to be difficulty in supplying the demand for cars. The public desire will be so whetted that they will, we feel, absorb every car that can possibly be built during 1919.

Demand Affects Used Cars

When a demand for motor cars exists it affects the second-hand as well as the new car market, and for that reason we look forward to pretty bright prospects in this field also. We do not believe that quite as long prices will be obtained for used cars during 1919 as was obtained for them during the latter months of 1918, and in view of the fact that it will be impossible to build anything like the normal number of new cars during the first six months of 1919, we do not feel that the used car market will be so surfeited with cars traded in on new cars that it will be overlooked. For that reason, with an ordinary demand for used cars during the first six months of the year, dealers ought to be able to clean up in pretty good shape and thus accumulate a brand-new stock when summer buying starts.

The hasty efforts on the part of certain companies to camouflage the price market by announcing all sorts of price reductions and price readjustments almost created a very unhealthy condition in the industry. Practically all of those companies who indulged in the price-cutting announcement were those who had made several increases in price during the period of the war, so that their minor reductions in price did not really amount to anything.

Some companies, like our own, immediately restored the prices which were current at a time when they were at least in normal passenger car production because of their ability to put themselves back on a normal production basis immediately. These, however, were a few companies only. Other companies set prices which would hold for the next six or eight months in order that the public might feel safe in buying.

Our price is fixed up until July 1 at least, and we are certain that there will be no further reduction in price from our present figure. If a change in price at all occurs after July 1 the tendency is bound to be upward, for we are now building our product as cheaply as it can possibly be built, and should a price increase be made it would simply be made in order to accommodate the addition of improvements to the product, which would make its net price to us greater.

In our opinion the increase in production which has been permitted would enable the manufacturer to keep pace with the increase in demand, but we do not feel that many

manufacturers will be able to take advantage of the opportunity to increase their production for various reasons. Because of that we feel that there will be an actual shortage of the better-priced cars during the first 6 months of the year.

I feel that the subject should be analyzed a bit farther and divided into two groups, the problem of the distributor and the problem of the dealer.

The biggest distribution problem, of course, is to reshape the selling organizations and get good men back to call on the trade, both in the retail and the wholesale fields.

There is going to be a great deal of competition for good salesmen, both in the retail and the wholesale ends of the business, and only the dealer who is ready and willing to spend real money will get the cream of those available.

The same holds true in the service field, but with the training that many mechanics received at the expense of the Government in preparation for work at the front there will be a greater number of high-class mechanics available now than ever before.

During the period of the war the automobile dealers generally found ways and means of conducting their business more economically and at greater profit than ever before. They will undoubtedly profit by this experience in handling the situation in the future.

We feel that business conditions are going to look upward unless some difficulty arises in the labor market, and this we do not look forward to, for we feel that the keen minds responsible for this feature of our activities will make it a point to avoid any such entanglement.—H. R. Hyman, Cole Motor Car Co.

Public's Belief in Price Drop Chief Problem

FROM the present outlook, the spring demand for cars will far exceed the supply. There is no question in the writer's mind but that the business will be on the increase throughout the summer, since the question of prices has been permanently settled by the manufacturers.

We cannot see where there will be any change in prices until at least after June 1, as the decreased price in materials since the armistice has been signed has been more than overcome by the increase in the price of labor.



At the present time the production of cars is not equal to the demand, and, considering the production of cars two years ago and to-day there is very little doubt but that the demand for cars will exceed the manufacturing of same by at least 200 per cent.

The dealer's opportunity at the present time is along the lines of propaganda in convincing the general buying public that there will be no radical change in the price of cars, as a general impression has been created throughout the country that the popular makes of cars will decrease in price several hundred dollars.

We cannot see anything but prosperity for the motor business inasmuch as the tremendous increase in salaries automatically has created thousands of buyers of automobiles—people who under ordinary circumstances would not be in a position to make an expenditure of the cost of a car for pleasure.

Our advice to all dealers, regardless of the line which they carry, would be to secure immediate deliveries on just as many of these cars as it is possible for them to place in their warehouses, as the time will soon come when the demand will so far exceed the manufacturing ability that it will be practically impossible for the dealers to get cars in any quantity.

We cannot say too much to impress upon the minds of the dealers the fact that they will have to convince their customers with reference to prices. This is one of the big points, and unless they can convince the buyers in their respective territories as to the maintenance of the present prices, it will not be necessary for them to do any wondering about the delivery of cars, as they will not need any cars.—G. L. Moore, Moore Motor Vehicle Co.

Better Selling Organizations Needed, says Elgin

WE feel that the spring demand for new passenger cars will be greater than the production. We are sure that this is going to be the situation with us. We likewise are sure that the demand throughout the summer will exceed our production.

The majority of our distributors have a separate organization to handle the second-hand car question in their territory. We find that a used-car organization is essential to the successful marketing of a volume of new cars, and our dealers have organized a separate company for this purpose.

With the present price of material and labor, we do not believe it will be possible to make any reduction in the price of our car for the next six months; in fact, we have already guaranteed our dealers against a decline in price up to May 31.

In our judgment, if it were not for the stock of pre-war models now in storage in some section of the country, the production of new cars could not possibly keep pace with the demand. This stock of cars and the reduction in their price, of course, will affect the new car production to some extent. Inasmuch as we have an entirely new car and no old, pre-war cars on hand, we do not feel it will affect our organization.



We have outlined a plan to our distributors, which we feel will improve their opportunities to extend their business. We have had them at the factory and carefully covered these various phases. We feel the principal opportunity in extending business in their territories, is:

- 1—To get a better class of dealers.
- 2—Improve their selling organization.
- 3—Define service policy clearly, and prepare to give better service to their dealers and car owners.

The dealer's real problems for the coming season are to secure a better dealer organization, replacing the weak with the strong; closer co-operation with his sub-dealers, both from the standpoint of sales promotion and better service arrangements. Our larger distributors have greatly increased both their selling and service organizations, putting better salesmen into the field, increasing their stock of service parts and co-operating closely in the work of sales and service with their dealers.

Through the Central West, the Northwest, the East and a good portion of the South I feel general business conditions of the country are better than they ever were before. The cotton situation in the South is affecting all classes of business, and particularly the automobile business, at the present time, but we feel that general business conditions were never as good as they are at present. Of course, there are things ahead, which in our judgment will affect the sale of automobiles to some extent, namely, the next Liberty Loan and the proposed new tax. Otherwise, business conditions were never better, or future prospects.

Our one big message for the dealers of the country, as a whole, and particularly our dealers, is that we have no pre-war cars to sell. We have spent eighteen months in perfecting the car that we are now producing and shipping an entirely new car, which we feel with the proper sales effort will meet the keenest competition.—C. F. Jamison, Elgin Motor Car Corp.

Caution as to Used Cars Taken in Advised by Lexington

WE are confident that the demand for passenger cars will be as good or better as in any past years in the history of the industry. We feel that the demand will increase steadily through the summer and fall of 1919, as the crops promise to be exceptionally good throughout the country and money

will be more liquid on account of few, if any, Government securities being offered.

We are a little dubious about the used car market and feel that the dealer will do well to go slow in taking used cars in trade on new merchandise.

We see no chance for real price reductions during the next six months and have absolutely guaranteed our dealers against a price change until July 1 next.

We very much doubt that passenger car productions, as a whole, will keep pace with the increase in demand, although there are some companies like our own who are in position rapidly to resume their normal production.

Most dealers are in better shape than they have been for several years past as regards used cars in stock on account of the shortage of new cars for the past six months and the consequent demand for used cars. The dealer can best improve his opportunity by keeping himself in this desirable shape by going slow on trade-ins, as above noted.

The dealers' problems during the coming season largely are confined to the question of man power, both in the sales and service departments. It will be many months before the expert mechanics are released from duties overseas, and this to a large degree affects former salesmen also. We do not feel that the price question will be a problem, as that is bound to stabilize within the next thirty days when people discover the approach of the formal peace is not going to mean a radical and rapid reduction in prices in any line.

General business conditions should be good, because the demand for practically every commodity is going to be above par for a year at least.

Our big message to dealers all over the country is immediate deliveries of new models on account of our exceptional manufacturing facilities.—Emery Huston, Lexington Motor Co.

SITUATION BRIGHT IN CANADA

Winnipeg, Man., Jan. 17—Eleven big companies, with a total invested capital of close upon \$20,000,000, are engaged in the manufacture of passenger cars in Canada. In addition there are several large companies producing trucks and a great many concerns engaged in repair work and the manufacture of equipment.

A good prosperity barometer for the motor business in the Dominion is the report of registrations for the year secured from the highways or motor vehicles of the various provinces. Last year there was an increase in registrations throughout Canada of approximately 62,989 machines. This figure may seem exceedingly large, and it is large; yet it does not constitute the record increase in registration for the period of one year. In 1917 registrations were 78,984 greater than in 1916.

The figures for 1918 are not to be taken as indicative that Canada has on hand as many machines as may be accommodated to the use of the public. The last year was the last and hardest year of the war, and, having regard to the demand, motor vehicles were never so scarce in this country since the first self-propelled road vehicle was introduced to the Canadian public about twenty years ago.

Big Business Awaits Live Dealers

Letters from representative motor car merchandisers show expectation of unusually prosperous year, but indicate necessity of strict attention to service and sales

REPRESENTATIVE dealers from all sections of the country and handling all types of cars are almost a unit in the feeling that the demand for new passenger cars will be as great during the next twelve months as at any time during the pre-war period. However, they do feel that there is an urgent need of organized propaganda in the industry to counteract among the buying public the feeling created by war-time conservation needs, that motor cars are a luxury and that there is need for the same scrutiny of expenditure that existed before the armistice was signed.

In order to present to dealers as a whole the situation for the coming year as seen by representative motor car merchandisers throughout the country, MOTOR AGE sent a letter to a number of dealers widely scattered as to territory and representing a large number of cars, trucks and tractors. The wide response received to this letter indicates that the dealers are thinking seriously on these subjects and the almost total unanimity of opinion is the best possible indication that their ideas are correct, so far as anyone is able to forecast at this time.

Judging from these letters, the dealers seem to be pretty well satisfied that the demand for new passenger cars is to be very good—possibly with not so great improvement within the next few weeks but shortly thereafter, depending somewhat upon weather conditions and also upon the general awakening of the people to the feeling that war is over and its restrictions no longer are in force. The mental effect of the war still is with us and it will be some little time before the effect will be completely dissipated with regard to conservation ideas.

Demand for Used Cars

With one or two exceptions, all the dealers who are writing to us have agreed that the demand for used cars will be good. It will not be startling, but will be sufficient to give those dealers who are arranging to do so, a good trade-in proposition. Also the fact that most dealers have pretty well cleared out used cars during the past season will permit starting with a fairly clean slate.

No immediate increase in demand for trucks is expected, but it is anticipated that later there will be a most distinct increase in the demand when business recovers somewhat from the present state of uncertainty caused by the stoppage of war work and the withdrawal of war contracts. When the labor situation and the factories as a whole become turned over to normal peacetime pursuits and the

necessity for expansion for peace work is realized, the truck business will pick up.

Constructional work on a big scale throughout the country will require numbers of trucks. Whether or not the government may put some of its war trucks on the market in widely scattered districts, it is not believed that such will be sufficient to affect the market seriously.

So far as tractors are concerned there are no dissenters to the opinion that the demand for tractors will be more than the supply, also that this demand will increase rather than decrease, even though the immediate cause for greatly increased production may no longer exist. Farmers have found the value of the tractor during the past year or so, and it is anticipated that its value will be recognized in increasing proportions.

Good Accessory Business

Accessories for passenger cars, trucks and tractors naturally will be in the same condition as the vehicles for which they are intended and the accessory business can be expected to be exceptionally good.

Most of the dealers feel that the war has not been wholly an unprofitable thing for them in that they have learned a great many lessons particularly that of conservation. The motor car dealer in the future is going to be a far different dealer from the one he was in the past, his business will be operated more efficiently from every angle because the war has brought the realization of this necessity more forcibly to him.

Several of our correspondents bring up the point that they anticipate that there will be a much keener competition among dealers than in the past and it behooves the live dealers to remain awake and to get his organization on its toes.

Now is the time for the dealers to become sufficiently organized so that they can take care of the big business which is coming. They have in many instances lost their sales organization and have lost their service organization. To take advantage of the sales opportunities that are coming they should get their organization whipped into shape both as to numbers and quality. Only thus can they be successful. Dealers will have to pay attention to service; their service department can be made to pay a profit under the new conditions, skilled men who have gone into service are and will be coming back. Customers who through war conditions or who perhaps through in-

ferior service during the last year have kept their cars out of the service station will be coming back—they can be brought back by proper circularizing and advertising.

The most important problem from the service standpoint is that of labor. It need not be anticipated that labor costs are likely to decrease for some time. However, the dealer will be able to get better labor at the same price, which is quite an improvement.

The greatest problem from the merchandising standpoint is the fact that the buying public still is anticipating a drop in prices which certainly cannot be great or general. This is a feeling which the dealer must combat. It is a feeling which is based on a wrong promise and which is

going to militate against sales of new cars until it is overcome.

It has been the history of past wars that material costs and, to a certain extent, labor costs, have held up for an indefinite period after the cessation of hostilities. In the present instance it is folly to anticipate any great decrease in prices of manufactured articles when the parts and materials from which they were made were bought at wartime prices.

The dealer who gets his organization both from the sales and the service end into tip-top shape and is ready to take care of the demands is going to have good business and is going to do business in a profitable way.

"1919, Let's Go!" Gibson Slogan

WE down here, feel very optimistic. Since the armistice was signed there has been considerably more interest displayed by prospects and customers than has been for several months previous, and there has been less difficulty in contracting with dealers than we have experienced in the past two years. With their opinions as a basis, and with all the information that we can gather, we believe that the spring demand for both new and used cars will be far greater than the supply, for it is going to be most difficult for the factories to get up any where near pre-war production before summer or early fall.

We believe that the motor car and accessory dealers have learned a great many lessons from the war, especially that of conservation. In other words, we believe that *the motor car dealer in the future is going to be a far different dealer than in the past, and his business will be operated far more efficiently from every angle, because the war has brought the realization of this necessity more forcibly to him.*

There is every reason why optimism should prevail, because in manufacturing communities, *the people have more money than ever before*, and in agricultural communities the farmer has never received the prices for his products that he is receiving now, and these prices should continue for some time to come.

Our Slogan is "1919, Let's go."—The Gibson Co., Indianapolis, Ind.

Expects Keener Competition

WE believe that the spring demand for passenger cars is going to be good; that the demand for trucks will be moderate; and we are not in a position to discuss the demand for tractors because we are not in that business.

It is our opinion that the demand for second-hand vehicles will not be as great as it has been during the past eighteen months and that they will move with much more sales resistance than has been experienced during the past eighteen months.

It is our opinion that the dealer is going to have to face much stronger competitive conditions in his business than he has ever faced before. He has got to be very strong



in the faith in order to prevent the owner from selling him his second-hand car when he is buying a new car from him and has got to be very sure that in buying the prospective customer's second-hand car he is buying it at a price at which he can market it and get out whole. There is no question but that there will be ample supplies of passenger cars to take care of the demand and it is going to put the dealer on his mettle as a salesman.

I can hardly anticipate that the demand will be any greater for passenger cars than during the pre-war period, although I believe it will be greater for trucks, because the truck demand has rapidly increased during the past two years. I do not believe that the demand will be greater than the increased

A Message for Dealers of U. S. A.

By F. W. A. Vesper

President National Automobile Dealers' Association

NINETEEN Eighteen, with its perplexities and its problems has passed and gone and Nineteen Nineteen with its promise and prosperity stands upon the threshold. The motor car dealer who has profited by the happenings of the past certainly will reap the benefit of the future. For the first time in history the importance and the magnitude of the motor car dealer's business generally is recognized and understood. By its future conduct will it be judged and will it either enhance its position or suffer in its standing.

✱ ✱

The motor car dealer must recognize that his business must be conducted on a business basis to merit the position it deserves at the hands of legislators and the public, and as he dignifies it by continuing to eliminate those things which in the past have caused wrong impressions will he naturally gain the prestige in his community that he deserves.

✱ ✱

The serious situation of the past will point very clearly to the necessity for the dealer's earnest consideration of the conditions surrounding the conduct of his business and, therefore, to be properly prepared for the splendid future that is sure to come he must profit by the lessons learned in the past. The motor car is one of the most important items in the life of the Nation to-day, and by the same token

the motor car dealer need offer no apology to his banker or his community for being engaged in such a business but has a right to demand the consideration that a business of such importance and magnitude deserves. The motor car dealer individually and through his affiliated associations will, if he is wise, become active in all those things that attain to the greater development in the use of the motor car, such as good roads, rural express, proper laws for owner as well as dealer and every other movement that makes for the extension of motor transportation. For in so doing is he building for his own future. The development of automotive transportation of every sort is sure to receive an impetus following the demonstration of its efficiency during the war far greater than is possible at this time to predict, and to properly avail ourselves of the returns such development is sure to bring we must have prepared our business so that it may grow in proportion. Such preparation is obtained best by active, vigorous participation in everything that will tend toward helping such development.

✱ ✱

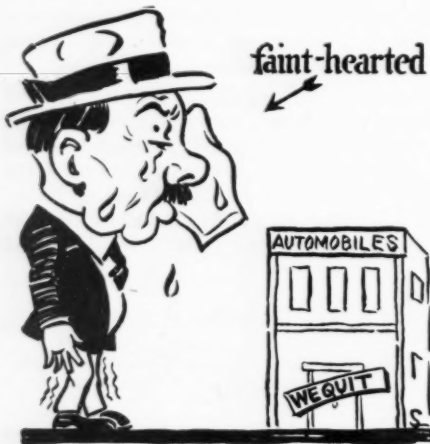
Therefore, no more a game but a big important business and no more to be called or considered a pleasure car, the motor car has become a factor of transportation of such importance that it does command the consideration of the world it serves.

available output from factories, but I believe that it will be sufficient to absorb the factory output.

The general business prospects in our territory are good. This is a farming community and the farmers have profited wonderfully during the past two years by reason of the high prices which they have received for all the products of the farm and there is every evidence that these high prices are going to continue, there is every evidence that the farmer is going to strain every nerve to increase his production and to farm every foot of land possible. With these conditions confronting us, we naturally look forward to generally good business conditions throughout our territory.—Nash Sales Co., Omaha, Neb.

Spring Demand Has Started in St. Louis

THE spring demand for new passenger cars and trucks has already started in this vicinity, and all indications lead us to



believe that this is going to be one of the big years in the automobile business.

A great many men are returning from overseas, who have always driven automobiles. When they left their former occupations, they disposed of their cars and a great many of their other interests as no one knew when they would be back. They are all coming back now enthusiastic and we find a great many of them at once purchasing new automobiles. Owing to the public's familiarity with the wonderful use of motor trucks during the war and the fact that deliveries to non-essential industries amounted to practically nothing the past year, we believe from all indications that the truck business is going to have one of its biggest years in its history.

I predict that every automobile factory will be taxed to its utmost to take care of its demand. Business conditions in general in this territory are exceptionally good.—Southwest Nash Motor Co., St. Louis, Mo.

Jordan Said It

WE have every reason to believe that this spring will bring us more business than we can hope to take care of. We are expecting and preparing for an unprecedented demand. We know nothing of the truck and tractor situation as we find we have all

we can do in taking care of the Jordan passenger car business in our territory.

It is our belief that the demand for used cars will measure up right along with the new car conditions.

The new problems of the dealer will be many and varied. We could write pages on this subject but we have not the time. The immediate and paramount need of every dealer right now is what (when we are alone together) Jordan calls "Guts." The public is going to buy the cars and pay the price. The faint-hearted dealer who is too timid to stock cars now because of possible price changes might just as well close up his business right away because the situation in this regard is going to be uncertain for months to come and perhaps for years. Those who have the courage to get ready for the big demand are the ones who will do the big business this spring. Everyone is talking and expecting it and, when you get to the last analysis, isn't this what makes prosperity?

Our investigations have proven to us beyond a doubt that few, if any, of the factories can immediately increase their output sufficiently to meet the demands of the next four months. We certainly believe that there will be a serious shortage of passenger automobiles this spring. —Chicago Motor Car Co., Inc., Chicago.

Sees Big Demand for Cars

WE expect a very great demand for new passenger cars this spring, and while we look for a number of truck and tractor sales, we do not believe the volume will be so great as some expect. We do not look for an unusual demand for second-hand cars this spring, but just about the average business.

In our opinion, one of the greatest problems to meet will be in the overcoming of the propaganda which has spread against the automobile business. The preaching of economy has been deeply instilled in many, and the hint by the Federal reserve bank to banks in their respective territories regarding the banking of automobile dealers has, of course, made a problem in the financial way. The distributors who have been so short-sighted as to disrupt their dealers' organization, purposely selling cars only at retail during the war, has broken up many organizations and, of course, when they start to build up, are bound to cut in on others, both dealers and employees, and we cannot fail to see that competition will be even keener than before.

We feel that the demand will become greater as the season advances, but if all factories of which we have been advised so greatly increase their output, then the output should easily keep pace with the demand.

General business conditions in our territory are excellent. Money is plentiful, but as previously explained, bankers are adverse to banking automobile dealers at this time.—Western Motor Car Co., Omaha, Neb.

Good Prospects in South

THE spring demand for new passenger cars in this territory should be good, provided the price of our chief commodity here, cotton, advances to 33 cents or more

per pound. The truck and tractor business will also depend on the cotton price. If the price of cotton is 35 cents or better, business here should be extremely good and southern dealers will probably have a demand in excess of their ability to supply.

Demand for second-hand vehicles will depend upon the same conditions as the demand for new vehicles.

The gravest problem to my mind that the dealers are facing at this time in regard to changes in market is the question of price reduction. Most of the dealers in this territory operate on small capital and depend upon banks to unload most of their shipments. Unless the price can be guaranteed and unless the banks feel that the demand is going to be good, then they will not feel like advancing money to the dealers on cars.

The demand for cars this spring should be in excess of the demand of 1914-1915. I will be well pleased myself however, if it is as good as the demand of 1917-1918. I hardly think that it will reach the proportions of 1918 demand.



General business conditions in this territory are good. There is more money in the South than ever before. The banks are in good condition and the farmers are also well fixed, and I believe in position to hold their cotton and demand higher prices.—Joseph G. Blount, Atlanta, Ga.

They Know They'll Get the Business

THIS organization is entering upon the New Year with a highly optimistic spirit, as we believe that the demand for passenger cars of standard manufacture or, in other words, cars that have proven their worth to the financial and moral responsibility of the manufacturer, will be in demand more than ever before, during the year Nineteen Nineteen. We also feel that the demand for used passenger vehicles will be very good.

This inter-mountain territory benefited very little from the war profits, and we believe that for this reason it has more to gain immediately than the sections of the country where vast numbers of men have been employed for the manufacture of war materials. More labor will be employed in the middle west this coming year than ever before.

We do not believe that there is any question but what the demand in this territory will be greater than ever before. General business prospects are splendid, in fact, all of us feel that the influenza epidemic had more to do with the curtailment of business than any other one thing has had for a great many years.

Our plans for the immediate future, are so optimistic that we are strengthening our organization in such a way as to take care of the business, which we not only expect but which we know we will get.—The Tom Botterill Automobile Co., Salt Lake City, Utah.

Expects Excitement Plus Profit

WHEN you ask an automobile dealer what are his ideas about 1919 I can easily imagine that his replies must necessarily be about as vague as the replies of a banker when you ask him about the future. None of us can do any more than guess, and probably one guess is as good as another. There is one thought that would seem to stand out pre-eminent and that is that we are not able to look very far ahead in this industry at this time and therefore we must be prepared to always take advantage of every opening, be ready, as it were, to make new decisions every morning and change them every night and be everlasting on the job.



For the excitement of the thing, I would rather be in the automobile business the next twelve months than any similar period of time in my experience, but I feel sorry for the dealer who isn't willing and in a position to sit tight on his job constantly.

Passenger cars will be in big demand—only the weather can interfere with the date that the demand most urgently manifests itself—every indication points to the necessity of the dealer buying all the cars he can finance when and wherever he can get delivery, in anticipation of a big buying market.

There will be a good market for used cars but here the principal worry is price. The reduction in new car prices has already affected the used car market seriously. Many dealers are going on cars traded in at prices that were fair, considering the new car prices then prevailing, but each \$100 lop for new car prices has meant at least \$100 off the used car value. The owner of the old car that hasn't been traded has last fall's price

in mind and will try to hold the dealer to it. The new spring buyer of a used car has the new car price cuts before him.

Labor conditions are much improved. Price will not come down materially, but better men can be had. The Government training has improved even the best men so that the dealer can pick his men and get real returns for his per hour payroll. If he followed the War Industries Board's recommendation and put his shop on a cash basis, he need never depart from it. If he didn't, the sooner he does the better. The war did give every dealer a chance to get his business on a real business basis. If he didn't take advantage of it he had better start a campaign of better business methods quickly, else his was basis competitors will beat him.

Business will be good because—

1—Industry is active, ships will continue to be built, steel for peace will take the place of steel for war, the mills will be busy filling the shelves that war demands have kept empty.

2—Farmers are assured of good prices, for the world must be fed.

3—The returning soldiers add to the number of buyers, not only to the extent that they themselves buy, but many a family has put off purchasing because the boy was over there and now will buy because the boy is coming home.

4—Money will be available for proper business requirements and at reasonable rates, and the bankers in our section favor the motor car dealer if he handles a car of known value and runs his business in a businesslike manner. Many a dealer has been refused credit for no other reason than that he kept his books in so sloppy a manner that he couldn't give his banker a true statement.—Overland Harper Co., Philadelphia, Pa.

Native Sons See Silver Lining

WHILE we, in this locality, do not experience the spring rush of business such as the eastern dealers anticipate, nevertheless conditions have naturally improved with us during the last thirty days, thus far affecting principally what might be termed the morale of the situation.

The automobile business in Los Angeles and Southern California seems to be in a healthy state. The demand for used cars is very good and the market not overburdened, so that prices are still holding well. While there are a large number of new cars in storage in this city they are not being pushed on to the market in such a manner as to cause a stampede. Both the distributor and the dealer have learned a lesson that they will remember for some time. The automobile business heretofore has been operated upon a basis which might be termed all its own, where the overhead was almost allowed to run wild.

The result of the conditions through which we have just passed has given the dealer an opportunity to analyze his overhead and the result will be that while there will not be quite the volume of business done in the future which there has been in the past the net profits, I believe, will be just as large or larger. Production is bound to be limited during the present calendar year and very

few new models can be expected before early fall. In my estimation the real healthy demand that all automobile men expect directly will not really materialize much before early fall.

The general opinion among citrus fruit growers in Southern California, derived at from personal conversation with a number of them in different districts only yesterday, leads to the conclusion that the recent freeze has resulted in from a 15 to 20 per cent loss on the crop, with very light, if any, loss on trees, which, with a fairly abundant crop this year, considering the fact that oranges and lemons are bringing a big price, means that the citrus crop is going to bring very satisfactory returns, and while this industry is comparatively small as it relates to the total of Southern California productions, nevertheless it seems to be very largely a barometer of what to expect in the way of business.

The general conclusion is that the prosperity of Southern California, as compared with the prosperity of the balance of the United States, shows every tendency toward exceeding that of previous years, business being on a more satisfactory basis this calendar year.—Lord Motor Car Co., Los Angeles, Cal.

Demand to Be Greater than Ever

IN my estimation, the spring demand for passenger cars and tractors will be excellent. The demand for trucks would to my



mind be no greater than existed prior to the war—as we have equipment in railroad traffic—the possibility of purchasing second-hand trucks from the Army and Navy—and the fact that a number of business houses bought large number of trucks during 1917-18—would prevent any unusual business in this particular line.

The business for passenger cars should be excellent, however, from two or three standpoints. In the first place, I have no doubt that automobile manufacturers are too optimistic of their production figures for 1919, as the difficulties in their way toward securing sufficient material and labor, I think, are greater than they realize. This will tend to cut down production to a probable figure of 400,000 to 500,000 cars—whereas the demand which before the war absorbed over a million cars a year in this country will be greater than ever.

The demand for tractors due to a large number of people, who have in the last few years turned to agricultural pursuits as a money-making proposition, will undoubtedly be great—whereas, the manufacturers, who have facilities for making tractors are still very few.

The demand for second-hand vehicles should be good at reasonable high prices—due to the same reasons as outlined for new passenger cars.

Undoubtedly the most difficult problem for



dealers to face today is the question of labor in their service and repair shops.

It is unfortunately the truth, that although, on the other hand, the automobile owner sees the higher cost of living, he strenuously objects to any increase on shop labor per hour.

There is undoubtedly only a small minority of dealers today who make money out of their repair shops—most of them being content to break even on this item in order to assist their sales department toward making up a deficit.

I do not feel that the demand will be greater than that of the pre-war period, but from the probable or available output from the factory, it will undoubtedly be great, and probably this state of affairs will exist for several years to come.

The general business prospects in the territory of southwestern Pennsylvania are in my opinion excellent, and I think the majority of dealers throughout the country who are wide-awake to their opportunities will find that the same condition exists in their territories.—Painter Dunn Co., Pittsburgh, Pa.

Prospects Never Better, Says Simons

REGARDING demand for new passenger cars, trucks and tractors if the future months are in keeping with the first month after the signing of the armistice, the demand is assured. We might say that December, 1918, produced retail sales for us in the city of Detroit which were \$12,000 in excess of any previous December.

As for the state of Michigan, rural territory which we control, every indication points to a big demand. The condition of the farmer financially, with the assurance of continued high prices of his product, cannot mean anything but large business. This applies to both passenger cars and tractors.

We anticipate a good business in our truck department.

Regarding the second-hand vehicles—the last twelve months have been an exception, and we do not believe that this year's demand for used cars will equal last year's.

However, we have hope that the returning soldiers will have some effect upon this business, in that they will be apt to buy a low-priced used car, due to the fact that they have sold the cars which they were driving before entering the Government service.

We don't believe that market conditions relative to automobiles have changed, with the exception of the used cars as stated. This will necessitate the dealer being careful upon allowance prices for used cars.

Labor conditions are improving rapidly, and now is the time for the dealer to become efficiently organized so he can take care of the big business that we feel sure will come in the early spring.

We believe that the demand will be greater than previous years, due to these facts—the shortage that existed the past year, the number of people who have refrained from buying cars due to sentimental and patriotic reasons and the greater number of people who are now financially able to buy cars.

We believe that the increase in demand will exceed the factory's production. This



is based a great deal upon previous years, wherein the manufacturer has, at this time of the year, built and sold to distributors and stored in various parts of the country enormous stocks of cars, that do not exist today to take care of the spring demand.

Prospects in our territory were never better. There will undoubtedly be a period of thirty, sixty or ninety days which will be consumed by readjustment of conditions brought about by the change of a war to a



peace basis, and after that business will be bigger and better than ever.—The Simons Sales Co., Detroit.

Truck Business Fair, Cars Fine

THE truck situation we would say would be just fair. The passenger car business, after the first of March, will be, in our



judgment, extremely good. The demand for second-hand cars ought to be good after the season starts.

New problems for the dealer to face are the labor problem first, which is probably the most important, and we here at this office are very strong for giving those boys who were with us before the war and who went into the service their positions back, even though we have to discharge some of the help we have at the present time, although we do not think this occasion will arise, because of the increased business we look for.

We believe that in the line which we handle—namely, the Overland—the increased amount of business we will get will be much more than we have ever experienced in our history. This means, of course, that we will do more business than in the pre-war period. This is occasioned because of the cars we have sold the past year having given universal satisfaction, and because we are looking forward to great sales, owing to the new model which is to be put upon the market the middle of next summer. The general business prospects in the territory seem good.—Connell & McKone Co., Boston, Mass.

Better Service Dealer's Problem

THE spring demand for new cars is going to be especially good, if the number of prospects coming into our salesroom is any indication.

We believe the used vehicle market will be very good, but only for those cars which are put in first-class shape.

The problems for dealers to face are a lowering of salaries in all departments, such as sales, service and office; service inspection increased in quantity and as early as possible decreased in price; market conditions watched closely with the idea of not buying in a reduction with a large stock on hand.

We feel the demand will be as great as

before-the-war period, but have no information regarding the available increase in the factory output.

General business conditions in this territory appear to be very favorable.—Franklin Motor Car Co., Indianapolis, Ind.



Price Situation Problem in Sioux City

FROM observation in our territory I find that the spring demand for new cars, trucks and tractors will be practically normal as compared with 1918. The demand for second-hand cars seems to have taken quite a slump. *The greatest problem that we are facing at the present time is the buying public anticipating drop in prices.* I do not believe the demand for this spring will be as great as that of the pre-war period.

General business prospects are very good, considering the bad roads, which we have had to contend with for the past five or six weeks.—United Motor Sales Co., Sioux City, Iowa.

War No Longer Excuse for Poor Service

I believe that the spring of 1919 will see the largest demand for new passenger cars that has ever been experienced by the motor car dealers. I base this opinion on the fact that thousands of motor car owners have, from a patriotic standpoint, refrained from buying new motor cars during the war and have been content to use their old cars throughout the war period. Today there is a feeling of relaxation and as the great majority of business men made money during the war, I cannot think of any other business that will reap a bigger benefit than the motor car manufacturers and dealers since we have returned to a peace basis. This information is verified by talking to our own customers and prospective purchasers.

The demand for good second-hand cars will start earlier than usual and will be very heavy. This will hold the price at about its present level. The demand for second-hand cars four and five years old, particularly of the heavier type, will not increase, in fact, it is steadily diminishing, and this is the

point where the dealer wants to be careful not to get loaded with unsalable second-hand cars.

There are not many new problems for the experienced dealer to face. He must look forward, not backward. He should go over his organization, strengthen up the weak links of his chain, stop some of the leaks that he must know exist and remember that the war is over and *he can no longer use the war as an excuse for poor service and possible discourtesy to the customer by his employees.*

General business prospects in this territory are exceptionally good, not only in the motor car field but in practically all other lines of business with the exception of the few industries that devoted their entire plants to war materials and allowed their regular line of business to suffer. I do not believe that there will be any large amount of unemployed labor, and, as statistics show, there is more money in circulation today than at any time in the history of the country.—Donovan Motor Car Co., Boston, Mass.

Good Business but Keen Competition

IN our opinion, business conditions for the coming year are excellent, and although we believe competition will be extremely



keen, we also believe there will be ample demand to consume all vehicles which may be had for this territory.—Pacific Nash Motor Co., San Francisco, Cal.

Closer Dealer Co-operation Needed

OPINION based upon recent conditions points to a strong demand for new cars and trucks, since sales, inquiries and interest in present and future purchases show marked increase over last year.

The used-vehicle demand is one with which we are not very familiar as, owing to the question of values of used goods, we make but few trades. It seems that the chief consideration at this time is the basis of trade-in value on the second-hand car. Reduction in factory lists on new goods means declines in the used-car values, and the placing of the used product upon a commercial rather than a speculative basis is most essential at this time.

General business conditions throughout this territory seem satisfactory from every angle, there being marked evidence of activity in all commercial lines and an awakening interest in agriculture, mines and oil. The extension of national parks and development of the good roads movement undoubtedly will enlarge the market for automobiles and trucks in Colorado. We look forward to better business and are preparing to take care of a larger volume.

Present trade conditions demand closer dealer co-operation that the individual and the trade in general may develop the utmost benefit therefrom.—Spinney Motor Co., Denver, Col.

Business Will Depend on Ability to Get Cars

REALIZING one person's guess is perhaps as good as another's, I predict as follows:

The spring demand for new passenger cars will be far beyond the factories' ability to deliver, especially of the well-known makes of cars. The buying public has been holding off several years in their endeavor to make their old cars do, and, therefore, the above prediction. This, combined with the apparent inability of the factory to get back into volume production in time to turn out any great volume of cars and further combined with the fact that our deliveries start with March 1, which is almost at hand.

I further predict the usual good demand for second-hand cars, especially at the opening of spring, but not at the same high prices as of the past year, and that the second-hand prices will adjust their prices according to the lowering of the new-car prices.

There are hardly any new problems that the dealer will have to face for the coming year, outside of the usual problems of the past. However, the changes seem to be running more into the financing end than ability to sell cars—in other words, time sales are getting to be a bigger factor than ever before.

Shop and labor conditions undoubtedly will better themselves, both as to lower wages and



better grades of mechanics, meaning better work.

In total, I predict one of the biggest years for the retail business that we have enjoyed for several years past, depending only upon

(Concluded on page 111)

The Cars in Brief

Models Offered for 1919 and Their Changes As Compared With Year Ago

Arranged in Alphabetical Order

CARS BY CYLINDERS

Fours			Sixes				Stephens	Westcott
Allen	Ford	Piedmont	American	Elgin	Klinekar	Oakland	Studebaker	Winton
Biddle	Harvard	Reo	Anderson	Franklin	Lexington	Oldsmobile	Velle	
Briscoe	Harroun	Revere	Auburn	Geronimo	Liberty	Paige		Eights
Campbell	Hatfield	Seneca	Buick	Glide	Locomobile	Paterson	Apperson	Hollier
Chevrolet	Hupmobile	Stearns	Case	Grant	Maibohm	Pierce-Arrow	Cadillac	King
Commonwealth	Maxwell	Studebaker	Chalmers	Haynes	Marmon	Piedmont	Cole	Oldsmobile
Crow-Elkhart	Mercer	Stutz	Chandler	Hollier	McFarlan	Pilot	Cunningham	Peerless
Dixie	Moline-Knight	Templar	Columbia	Holmes	Mitchell	Premier	Daniels	Standard
Dodge Brothers	Moore	Tulsa	Comet	Hudson	Monitor	Roader		
Dort	Olympian	Vernon	Davis	Jones	Moon	Saxon		Twelves
Elar	Overland	Willys-Knight	Dorris	Jordan	Nash	Scripps-Booth	Austin	National
Essex	Phianna		Elcar	Kisselkar	National	Singer	Haynes	Packard

Allen

A LLEN has added a sedan for 1919 on the standard Allen 41 chassis, which has been in production during the last twelve months. A five-passenger touring car also is offered on this chassis. The engine is the company's own make, four-cylinder, with a bore and stroke of 3¾ by 5 and a piston displacement of 221 cu. in. **Borg & Beck clutch, Auto-Lite** starting and lighting and Connecticut ignition are some of the standard units used in the construction of this chassis. The bodies are roomy, low-hung and well finished throughout. All electric controls and the motor-driven horn control button are in unit in the switch mounted just below the wheel on the steering column. All lock simultaneously with a Yale key.

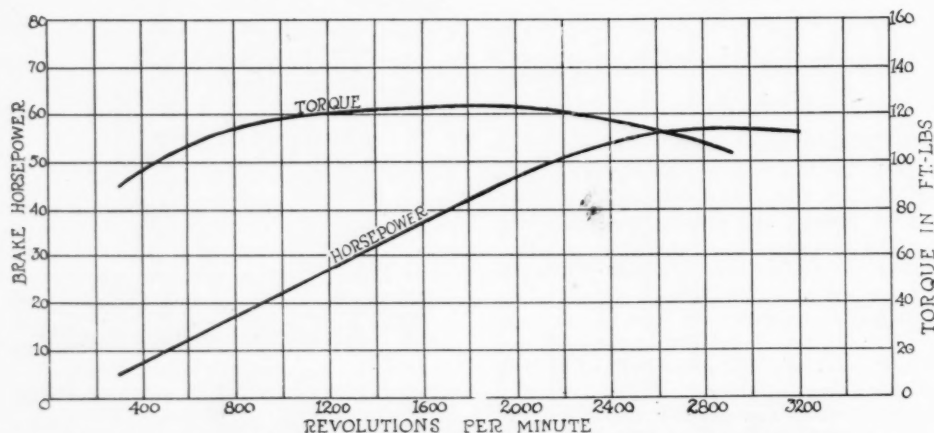
American

THE 1919 American includes the following refinements and changes in equipment: A new hood has been added with more vents, as well as a new one-man top, equipped with gypsy curtains and plate-glass windows in rear, with nickel trim-

ming front and rear. A new slanting rain-vision windshield has replaced the former type. Westinghouse starting and lighting has been installed, together with Atwater Kent ignition. The transmission has been changed to Grant-Lees and the steering gear to Gemmer. The other principal units remain the same, including Rutenber engine, Salisbury rear axle, Hotchkiss drive, Borg & Beck clutch, Zenith carburetor and Stewart vacuum feed.

American Beauty

THE 1919 models will consist of a two-passenger roadster and a five-passenger touring car. Production is to be doubled. This car is fitted with a Rutenber engine, and the body is low and very graceful in design, with a double cowl. The windshield has a very pronounced tilt and the whole idea of construction has been to give the car an impression of speed, combined with comfort. This car formerly bore the name of the company and was called the Pan-American. Only the five-passenger touring model was listed in 1918, which was the concern's second year.



Horsepower tests of first Essex engine made after 3500 miles of road work. Note flat torque curve. Horsepower curve peaks at 2900 r.p.m. Maximum torque at 1800 r.p.m. corresponding to a car speed of 35 m.p.h.

Anderson

THIS car is offered in two chassis models, both fitted with six-cylinder Continental engines. Model 400F has two body types, a four-passenger touring and two-passenger roadster. The engine of this model has a bore and stroke of 3½ by 5¼ in. Model 400A is offered with four body types, a five-passenger touring, seven-passenger touring, two-passenger roadster and five-passenger sedan. Its engine has a bore and stroke of 4¼ by 4½ and develops 25.33 hp. The wheelbase of each chassis is 120 in.

Apperson

THE company will continue the manufacture of the Anniversary Apperson in both the seven-passenger touring car and the four-passenger tourster. As a companion model to this car, which will list at \$4,000, it will build a more moderate-priced car, delivery of which will begin in May. It is expected, the new model to be known as the Apperson for 1920. This will be produced in a seven-passenger touring car and a four-passenger sportster. Both will be of the latest design and carry new bodies and fittings by C. T. Silver. The chassis will have the same engine and units, which are made by Apperson, manufacturer of all its units, from engine to rear axle.

Auburn

THE lines have been changed considerably to the square lines. Two body types are offered, a four-passenger and a five-passenger, mounted on the same chassis as the 1918 model 6-39. Finish is royal blue or purple lake for the bodies and hood with fenders and trimmings black enamel and Auburn gray. The fenders are crowned and of extra-heavy gage rolled patented flattened steel. Equipment will include a new electric headlight with auxiliary lights for city driving, electric cowl and taillights. A new two-piece, clear-vision, ventilating windshield is fitted.

Austin

THIS car has one of the longest wheelbases of American-built cars, 142 in. It retains the Weidely engine which has twelve cylinders and a bore and stroke of $2\frac{3}{8}$ by 5 in. Four body types are offered, a six-passenger touring, four-passenger roadster, seven-passenger sedan and seven-passenger limousine. Austin features include a two-speed rear axle, double-cantilever springs and Delco electric system. This car is known as the Austin Highway King.

Biddle

THIS company continues its 1918 model with several chassis improvements and new bodies. The special Buda four-cylinder engine now is equipped with aluminum pistons and lighter reciprocating parts, thus increasing the speed and horsepower. Both front and rear axles have been redesigned. The new Lemoine-type front axle is of chrome vanadium steel throughout and the rear axle has double-enclosed internal brakes and driveshafts, gears and tubes of special alloy steel. Complete equipment including six Rudge-Whitworth wire wheels, Hartford shock absorbers, Warner autometer, etc., is furnished. The new body types are the Speedway Special, a two-passenger roadster of racy style with removable top and windshield, and the four-passenger Salon sedan which is built especially for the custom-coach trade.

Brewster

NO changes practically have been made in the design of this car. As in the past custom-built bodies of all types are offered. They are mounted on the same chassis, which uses a four-cylinder Knight engine with a bore and stroke 4 by $5\frac{1}{2}$ in., Zenith carbureter, Bosch Ignition and other standard parts. An interesting feature is the spring suspension of cantilevers.

Briscoe

BRISCOE cars are continued for 1919 without change. The car has the same high, narrow radiator that characterized

it last season, and the slanting windshield gives an added touch to the appearance of speed and power. The engine of the Briscoe has a comparatively long stroke, having a stroke-bore ratio somewhat larger than the average. There is also an unusual drive of the generator from off the camshaft. The cone clutch is also somewhat different from most types, being of the inverted kind. In the body is a door between the front seats, which is out of the ordinary.

Buick

VARIOUS refinements are present in the Buick 1919 line. The valve lifters, rollers and pins have been made larger to reduce wear, a new oil gage has been provided, an oil filler makes it possible to fill the engine without the use of a funnel, and there are other refinements in the engine. Lubrication is made simpler throughout. The length of the rear springs has been increased 2 in. and the design such that the rear end of the car has been dropped $1\frac{1}{4}$ in., improving the riding qualities. The muffler cut-out has been eliminated to conform with state laws and N. A. C. C. recommendations. The louvers have been changed and made narrow, greatly improving the appearance. A U. S. L. battery, a third larger than the former type, is used. A new top is fitted, and various body refinements have been made. Six models will be offered.

Cadillac

ELEVEN body styles will be offered. A Suburban body style has been added. All are on the same chassis, type 57. This is in accordance with the company's poli-

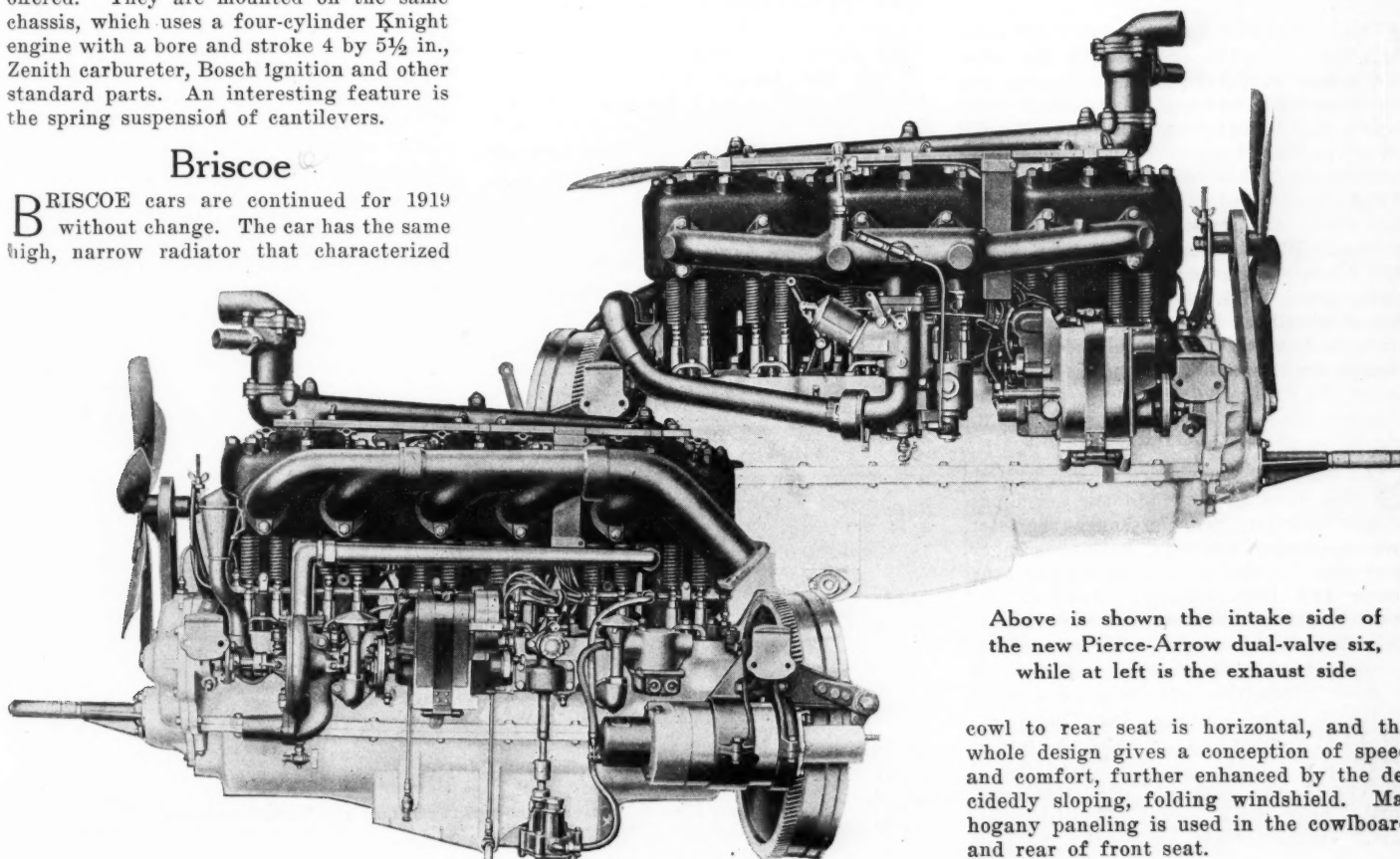
cies of the last three years. An eight-cylinder engine with bore and stroke of $3\frac{1}{8}$ by $5\frac{1}{8}$ is used. This has detachable cylinder heads with an oil-filling well on the fan-shaft housing, a new feature of 1918. Higher hood and radiator than in previous years are continued. There is a tilting headlight reflector and automatic top-raising device. Interior refinements on the closed cars are present. A notable feature, as in the previous year, is the absence of lace or braid, the binding material being the same material as the plain material.

Campbell

THIS is continued with practically no changes. The car uses a four-cylinder engine with bore and stroke $3\frac{3}{8}$ by 4 and uses standard parts such as Salisbury axle, Sunderman carbureter, etc. The body is full streamline, roomy with appointments thoroughly up-to-date. The line sells with complete starting and lighting equipment, etc.

Case

THERE will be no changes in this car until the 1920 model is offered, which likely will not be until August, 1919. The company is building the Case six, model U, in exactly the same chassis and body design offered during 1918. The closed car has been dropped. Those continued are the seven-passenger touring and four-passenger roadster on the same chassis. A Continental engine is used. The wheelbase is 125 in. Columbia rear axle, Rayfield carbureter, Borg & Beck clutch, Grant-Lees gearset and other standard units are employed. The top of the body line from



Above is shown the intake side of the new Pierce-Arrow dual-valve six, while at left is the exhaust side

cowl to rear seat is horizontal, and the whole design gives a conception of speed and comfort, further enhanced by the decidedly sloping, folding windshield. Mahogany paneling is used in the cowlboard and rear of front seat.

Chalmers

THE Chalmers line will consist of nine body styles. The open cars include a seven-passenger touring, five-passenger, touring and standard roadster. The closed cars comprise a five-passenger sedan, three-passenger coupe, seven-passenger town car, limousine, limousine-landaulet and seven-passenger town landaulet. The intake manifold of the ram's horn type continues the feature. This is made of simple piping carried on the exterior of the engine and so formed that it carries the gas to a hot spot in the side of the exhaust manifold and thence through gradual curves to the intake valves. Elimination of sharp curves prevents deposition of raw gas and reduces friction. The hot spot, however, imparts heat to the mixture. This is on top of the carburetor rise, so the gas is forced to come in contact with it.

Chandler

THE Chandler continues for 1919 its six car models mounted on the one chassis. The body styles offered are the seven-passenger touring, the four-passenger roadster, the four-passenger dispatch car, the four-passenger convertible coupe, the seven-passenger convertible sedan and the limousine. The dispatch car is finished in an electric blue color for the body, the hood, fenders and running gear being black. The other cars are finished in standard blue body color and black running gear, fenders and hood. The engine is made by Chandler and is block cast, has six cylinders, the bore and stroke being 3.5 in. by 5 in. The wheelbase is 123 in.

Chevrolet

CHEVROLET has two four-cylinders this year, the 490 and the FB. The 490 comes in a five-passenger touring car, two-passenger roadster, five-passenger open sedan and two-passenger coupe. The FB comes in three body types, a five-passenger touring car and two-passenger roadster and five-passenger sedan. The engine of both has a bore and stroke of 3½ by 4 and develops 21.76 hp., N. A. C. C. rating. Model 490 has a wheelbase of 102 in., 30 by 3½ tires, gravity fuel feed, while model FB has a wheelbase 8 in. longer and 33 by 4 tires and vacuum feed. Otherwise the chassis are the same as to units, etc.

Cole

SIX aerotype models are offered by Cole this year and include the seven-passenger tourster, four-passenger sportster, two-passenger roadster, seven-passenger, four-door toursedan, four-passenger tour-coupe and four-passenger townear. All these models are mounted on the standard Cole Aero-Eight chassis. The aim of the company is to build as nearly as possible as a stock production custom-made cars of moderate price. Hence, they have embodied as standard equipment in all models practically all the improved features of refinement and comfort associated ordinarily only with specially-built-to-order cars. Improvements have been made in



Oil cups instead of grease cups are used on Elgin spring bolts

the original aerotype design which Cole originated and presented for the first time a year ago so that now the Cole models offer an even greater advancement in designing than when they were first introduced.

Columbia

THREE body types are offered on a chassis with a wheelbase of 115 in. and a six-cylinder Continental engine with 3¼ by 4½ bore and stroke. They are a five-passenger touring car, four-passenger sport model and a five-passenger sedan. Standard units such as Stromberg carburetor, Borg & Beck clutch, Timken rear axle, Ward-Leonard starting and lighting and Atwater Kent ignition are used.

Comet

THE Comet five-passenger touring car and sedan for 1919 are of streamline body design, equipped with 3½ by 5¼-in. Continental 9N Red Seal engine, Borg & Beck clutch and Columbia axle. Two universals take the drive through a hollow propeller shaft. Both passenger car and sedan have a pleasing appearance, making a strong appeal to the purchaser desiring individuality.

Commonwealth

THE 1919 model is known as the Victory. It contains the 3¼ by 4½ six-cylinder Red Seal Continental engine and is a five-

passenger touring car. It has been refined and is designed to meet the demands for a lightweight quality car. Other specifications are 118-in. wheelbase, Timken bearings, Borg & Beck clutch, full-floating rear axle and freeze-proof radiator. The body is of the streamline type with double cowl and is upholstered in genuine leather.

Crow-Elkhart

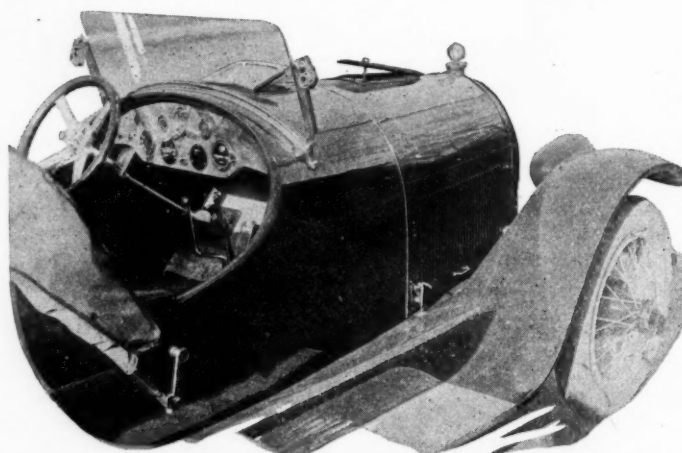
MECHANICALLY the Crow-Elkhart is improved and refined over preceding models. The 1919 line, known as series K, consists of five-passenger touring and two-passenger roadster of torpedo body design with four- and five-passenger DeLuxe models of full streamline design, all models have oval-based slanting windshield, large fuel tank at the rear. The company has replaced steel universal joints with the Thermoid-Hardy flexible joints which are made from a combination of sea island cotton and rubber. These joints require no lubrication, are very strong and durable and eliminate annoying rattles. In addition to their four-cylinder models, Crow-Elkhart is adding a six-cylinder car of medium price and light weight. On all their cars the purchaser has a choice of ten attractive and distinct color options with two upholstery options.

Cunningham

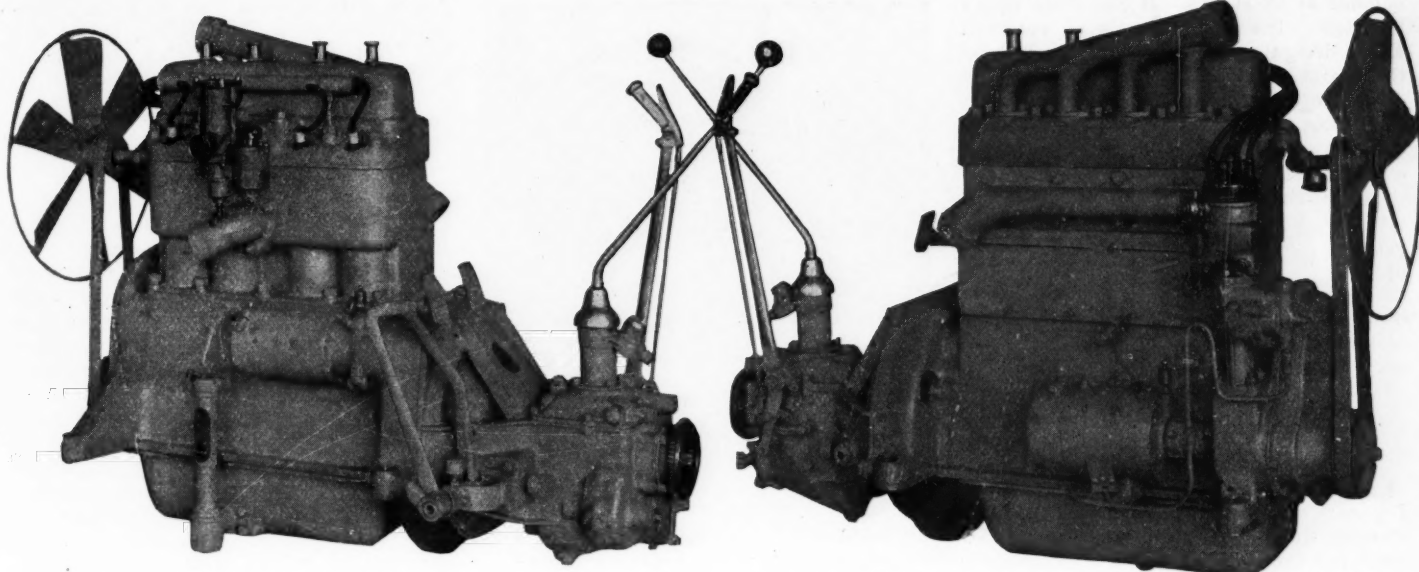
THE Cunningham chassis, except for a few refinements, remains the same for 1919 as for the previous season. The eight-cylinder engine has the largest piston displacement of any twin engine of American made cars. A feature of these cars is the sod pan which extends underneath the car for its entire length. The spare tires instead of being carried on the rear are now placed on the side of the car. Only the trunk rack is on the rear. The open body styles include a four-, five-, six- and seven-passenger touring and special roadster of the speedster type capable of 85 m.p.h. The closed cars are town car, landaulet and limousine. All are on a 142-in. wheelbase chassis.

Daniels

THIS car is fitted with an eight-cylinder Herschell-Spillman engine and has a wheelbase of 127 in. Five body types are



Looking into the driver's compartment of the Kissel custom-built Silver speedster



Essex powerplant showing four-cylinder unit with intake valves in head and exhaust valves in sides. Carburetor bolted to the cylinder head. Note short overall length of unit, the engine being 29 in. overall. The right side of the powerplant shows mounting of generator and ignition distributor

offered on the same chassis. Some fine custom-built bodies are produced to meet the demand for special bodies. Standard units such as Zenith carburetor, Brown-Lipe clutch, Timken rear axle, Westinghouse electric system, etc., are used in the chassis.

Davis

SUCH changes as have been made in the Davis line for 1919 consist of body changes and refinements and the adding of two new and very attractive closed cars, one a four-passenger coupe and the other a four-door, seven-passenger sedan. Seven body styles in all are fitted to two chassis models, each chassis model being equipped with a Continental engine, of 3.25 in. bore and 5 in. stroke, on the 119 in. wheelbase chassis and of 3.5 in. bore and 5 in. stroke on the 124 in. wheelbase chassis. Hotchkiss drive is used on each model.

Dixie Flyer

THIS car is offered as a five-passenger touring and four-passenger roadster. It employs standard units, such as the Lycoming engine, Carter carburetor, Borg & Beck clutch, Peru rear axle, etc. The wheelbase is 112 in. The engine is four-cylinder with a bore and stroke $3\frac{1}{4}$ by 5 and develops 16.90 N. A. C. C. horsepower.

Dodge Brothers

SIX body types are offered on the Dodge Brothers standard chassis model, which has a wheelbase of 114 in. and is fitted with a four-cylinder engine of $3\frac{3}{8}$ by $4\frac{1}{2}$ bore and stroke. These are a five-passenger touring car, two-passenger roadster, five-passenger sedan, three-passenger coupe, five-passenger limousine and five-passenger taxicab. The engine is the company's own make, which also uses its own make of many other units, employing such standard units as the Stewart carburetor and North East electric system in addition.

Dorris

THE characteristics retained in the Dorris 1919 car are a six-cylinder valve-in-head engine with seven-bearing crankshaft and camshaft; also the unit powerplant and multiple-disk clutch. There are some changes in the way of refinements and improvement, among them being a bolted-on cylinder head, doing away with the valve cages and furnishing abundant water circulation around the valve seats. Tubular valve rods and some other changes in details of valve mechanism are incorporated in the design. The wheelbase is increased to 132 in. and the chassis lowered by the use of a double-drop frame and underslung semi-elliptic springs in the rear, which are made of chrome vanadium steel of exceptional length, making the car extremely comfortable over rough roads. Large tires, 35 by 3, are used. The top is equipped with close-fitting curtains, those over all the doors being carried on rods, which make them convenient. A novel and unusual arrangement for protecting the curtains has been worked out.

Dort

THE chassis of this car has been slightly changed from the former model, but in the main it remains the same. Five body types are offered, a five-passenger touring, four-passenger roadster, five-passenger sedan, three-passenger coupe and five-passenger sedanet. This car has a wheelbase of 105½ in. and is fitted with a four-cylinder Dort-Lycoming engine that has a bore and stroke of $3\frac{1}{2}$ by 5 in. Carter carburetor, Mechanics gearset, Westinghouse starting and lighting and Connecticut ignition are used.

Elcar

ELCAR continues to offer a four-cylinder and a six, each with four body types. These bodies fit either the four- or six-cylinder chassis, because the frame is the

same in each case, with a wheelbase of 116 in. The six is a Continental engine and the four, a Lycoming. Standard units are employed in each chassis, with differences in the make used. For instance, the six uses a Stromberg carburetor, Borg & Beck clutch, Muncie gearset, etc., while the four uses a Carter carburetor, Mechanics clutch and gearset, etc.

Elgin

A LARGER engine and numerous detail refinements throughout the chassis, as well as later body lines, mark the new series. Three models have been brought out. Increased power of the engine is provided by $\frac{1}{8}$ in. larger bore, making the cylinders $3\frac{1}{8}$ by $4\frac{1}{4}$ in. Quietness is enhanced in the valve construction by a slight change in the shape of the valve lifters. The fan adjustment has been made more convenient. The starting motor has been raised above the center line of the flywheel, increasing accessibility. Lubrication of the engine has been changed to a combination pressure and splash. The steering arrangement has been improved by the use of a straight tie rod instead of a bent one. Greater roominess and comfort are provided by the increase in wheelbase, increased length and width of front springs, etc. Deeper and more comfortable seats are provided. One of the chief improvements, however, is the increased ease of maintenance, seen in the new location of the starting motor, new fan adjustment and oil-supply gauge.

Essex

THE engine of this car, which is entirely new, has four cylinders. $3\frac{3}{8}$ by 5, with the intake valves in the head and exhaust valves in the side. The total length overall is about 29 in. and the N. A. C. C. rating of horsepower is 18.2, while the actual power developed is more than 50 hp. The crankshaft is of special design, scientifically counter-balanced, giving static and running

balance at all speeds. It has three heavy bearings. The carbureter is of patented Essex design, automatically controlled by the engine. The clutch is of the multiple-disk type with cork inserts and runs in oil. The frame is of a new design, strengthened at front and rear by tubular cross members and is 6 in. deep at points of greatest stress, thus insuring absolute rigidity. Special attention has been paid to the spring suspension. All springs are of the semi-elliptic type; the front being 36 in. long and the rear 54 in. long. The radiator shutter insures control of engine temperature and is operated manually from the dash. The body is roomy with ample leg room and wide doors and seat.

Ford

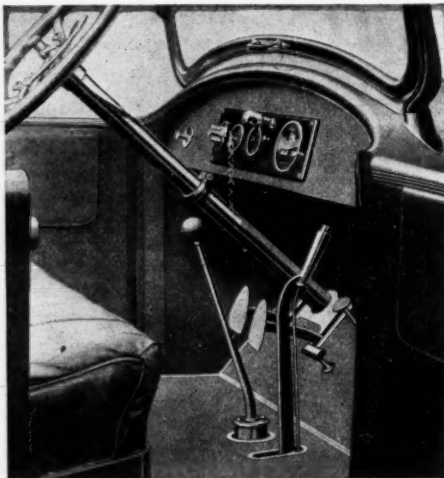
AS announced previously, the closed Ford cars are to be equipped with Liberty starters during the coming season. No other mechanical changes have been made known. It is expected that the starter will be applied to as many cars as is possible with the output of the starters, and ultimately it may be expected as standard equipment on all the bodies. Four body types are offered, five-passenger touring, two-passenger runabout, two-passenger coupe and five-passenger sedan. Due to the fact that the plant ceased manufacture of cars altogether and devoted its entire facilities to war work previous to the armistice, none of the minor refinements such as those made at the beginning of last year have been made so far.

Franklin

THIS chassis is continued without change. It has a wheelbase of 115 in. and is fitted with a six-cylinder engine with $3\frac{1}{4}$ by 4 bore and stroke. Six body types are offered, five-passenger touring, two-passenger roadster, four-passenger roadster, four-passenger brougham, five-passenger sedan and seven-passenger limousine. The air-cooled engine is continued, of course.

Geronimo

THIS car is made from standard units and is offered with four body types on a 122-in. wheelbase. The bodies are five-passenger touring, seven-passenger touring, four-passenger roadster and two-passenger



There is more room in front, and a footrest for the accelerator adds to the driving comfort of the Elgin

roadster. The engine is a Rutenber six-cylinder with bore and stroke of $3\frac{1}{4}$ by 5 in. Stromberg carbureter, Borg & Beck clutch, Walker-Weiss rear axle, Dyneto starting and lighting and Delco ignition with Willard storage battery are used. Fuel is fed by the Stewart vacuum system.

Glide

THIS car will be practically the same as for 1918. The line will consist of the light six five-passenger touring car and four-passenger touring car. The body lines are graceful and are carried out in a slanting windshield. A one-man top with Jiffy curtains is used. Colors are meteor blue for body, black hood, fenders and gear and white wheels.

Grant

THIS concern plans to continue the manufacture of model G until about September, at which time the 1920 model will be offered. It has, however, made numerous changes in model G which make it a very desirable car. The principal improvements are underslung rear springs, lower gearshift lever, aluminum molding between hood and cowl, new top, Gypsy curtains with plate-glass windows in the back, to-

gether with a much finer finish and more careful attention to details. Grant also will supply the car painted in a handsome maroon, stripped with gold, with cream wheels. A touring car and roadster are available.

Harroun

HARROUN body dimensions are unusual for cars in its price class. For instance, there is 49 in. of space between the upholstery of the rear seat, which is unusual in a light car with a wheelbase of 106 in. Runningboard, braces, muffler, brackets and battery with brackers are all one assembly and can be taken off or put on by six volts. The rear spring suspension is unusual in that the springs are hung inside the frame. One of the chief features is the flexible steering wheel, which has a spider of spring steel that eliminates strain on the driver's wrist. The engine is a four-cylinder $3\frac{1}{4}$ by $5\frac{1}{4}$ with an N. A. C. C. horsepower rating of 16.9.

Harvard

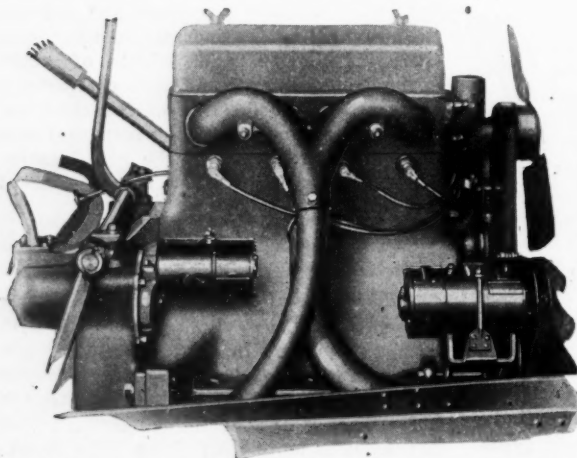
HARVARD has two cars for 1919, one a two-passenger roadster, the other a four-passenger cloverleaf model. Both use the same chassis and most of the parts are interchangeable. The radiator on the new car is streamline type 22 in. high. Pleated upholstery is used.

Hatfield

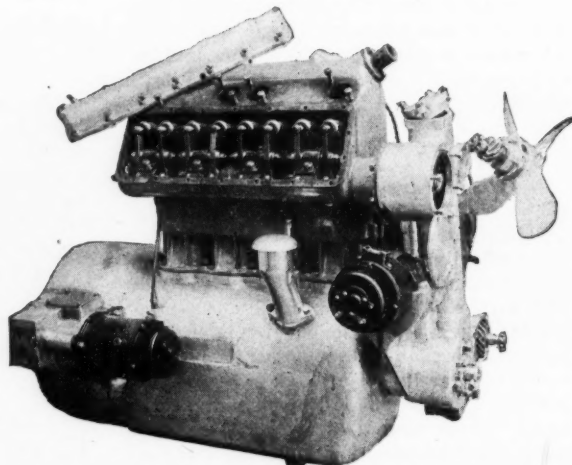
THIS car is a four-cylinder with a wheelbase of 115 in. Two body types are offered, a five-passenger touring car and a four-passenger roadster. A G. B. & S. engine with a bore and stroke of $3\frac{1}{4}$ by $4\frac{1}{4}$ in. is used. Zenith carbureter, G. B. & S. clutch, Grant-Lees gearset, Dyneto starting and lighting, Connecticut ignition and Willard battery are used.

Haynes

HAYNES is continuing the six- and twelve-cylinder chassis with a wheelbase of 127 in. each. Five body types are offered on each, seven-passenger touring, four-passenger roadster, seven-passenger sedan, four-passenger coupe and five-passenger town car. The six engine has a bore and stroke of $3\frac{1}{2}$ by 5 and develops 29.4



The Olympian engine with its enclosed overhead valve and unique manifold presents a very neat appearance



The new Revere engine with its spiral gear-driven camshaft which is located half way up the cylinder

hp., while the twelve has a bore and stroke $2\frac{3}{4}$ by 5 and develops 36.3 hp. Rayfield carbureter, Borg & Beck clutch, Haynes gearset and rear axle, Leece-Neville starting and lighting are employed in both chassis. The six uses Kingston and Remy ignition, while the twelve employs Delco.

Hollier

THIS concern is bringing out a practically new car, which has a good many added features and will sell in the \$2,000 class. In addition it has two five-passengers, an eight-cylinder and a six-cylinder. It uses its own engine in the eight-cylinder and a Continental in the six. Much of the other units is its own manufacture, with such standard units as Allis-Chalmers generator and motor, Remy ignition and Gemmer steering gear in the six and Splitdorf generator and motor, and Atwater Kent ignition in the eight. The front of the six, which was brought out new for 1918, is similar to that of the Rollys-Royce.

Holmes

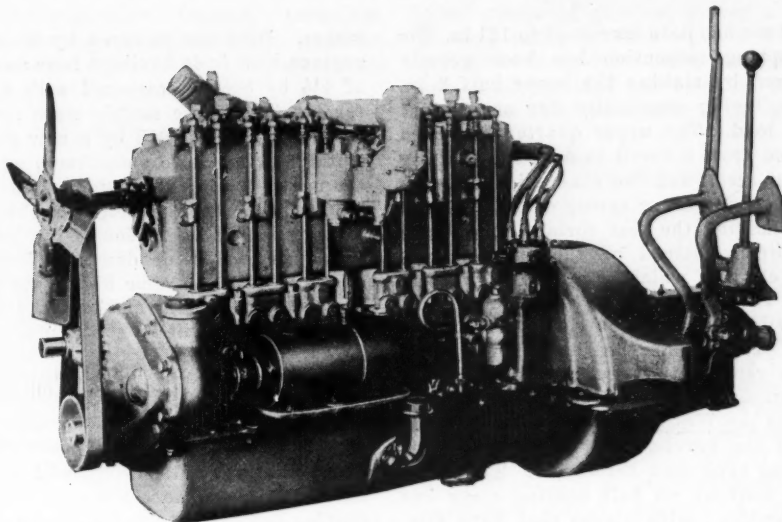
THE Holmes air-cooled car, which made its debut at the New York show last year, will be offered in three body styles, seven-passenger touring, four-door sedan and two-door sedan. As will be remembered the body designs are very distinctive. The hood is somewhat near the conventional form with a rather high but slanting front and air openings in front with hinges at the dash. The engine is a six $3\frac{1}{2}$ by $4\frac{1}{4}$. Valves are in the removable dome-shaped cylinder head and are inclined at an angle. A Newcomb carbureter, vacuum feed, Eise-mann magneto with automatic advance and Dyneto single-unit electric system are among the features. An original type of rocker mechanism operates the valves, the design being such as to compensate for lengthening of the pushrods so the timing will not be changed by expansion.

Hudson

THE only changes in the Hudson line this year consist of refinements in detail of body and chassis. The most important of these are the increase in length of the touring limousine body, making the rear compartment very roomy, and a change from bucket seats to solid-back front seats in the sedan. In this model the folding seats now face forward, and comfort for the occupants of these seats is secured by cutting away the back of the front seat on a sharp slope. A new visor is used on all Hudson inclosed models. This is of black fabric and is of equal benefit in stormy weather or in driving toward the sun. When not needed, it may be rolled back entirely out of the way.

Hupmobile

THE series R car which was brought out by Hupp last year as a radical change is continued for 1919. This is a four-cylinder car, smaller in point of wheelbase than the previous series but with as much room, due to a shorter engine and elimina-



Powerplant used in 1919 Maibohm, showing method of carrying intake air over top of cylinder block

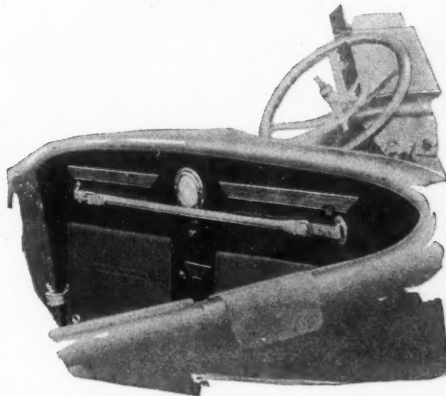
tion of the cowl tank. The wheelbase was decreased 7 in. to 112 in. in the design of this car. Four bodies are supplied in the series for 1919—five-passenger touring, three-passenger roadster, five-passenger sedan, four-passenger coupe. A complete hot-air arrangement constitutes one of the features which tend to care for low-grade fuel. Another Hupp departure is the detachable engine head.

Jones

EXCEPT for improvements in refinements, the Jones six is unchanged. Following its policy set a year ago, the company is making one style of chassis. The body lines for 1919 have undergone no particular change. Model 28E is a new addition to the line, being of a speedster type. It is equipped with cord tires and wire wheels, with color optional as is the upholstery. It is called the Oil Man's Special, and is designed for use in the oil fields with consistent sturdiness of construction.

Jordan

SIX custom-style bodies are provided for the standard Jordan chassis which has not been changed except for minor details since it first was produced from the finest available standard units manufactured in the country. The latest body style is that of the town sedan, which is



Moon seven-passenger, showing panel in back of front seat

of the fashionably modern four-door, straightline, complete-vision type. All the bodies are made of aluminum, finished in optional colors, and each model is completely equipped, including the Sport Marine, four-passenger, Suburban, seven-passenger, town sedan, brougham, town car and limousine.

King

NO changes in this line have been made for the coming year except in the use of flat springs and a slight re-designing in fenders. These changes are mainly for appearance, although improved riding qualities also are obtained by using the flatter springs. The car retains such features as the eight-cylinder engine, Stewart vacuum feed and little conveniences of detail which contribute to the comfort of the passengers. The bodies are made with the top sides sloping inward, and the rear deck of the roadster contains a large carrying compartment.

KisselKar

THE Kissel custom-built Silver specials will be offered in two models, the four-passenger tourster and the four-passenger speedster. They are mounted on the Kissel chassis with an engine with a bore and stroke of $5\frac{1}{8}$ by $5\frac{1}{2}$. A moderate-priced model is to be brought out, incorporating the same custom-built features. This will be a seven-passenger touring car and will make its initial appearance before spring. Features of these models are bullet-shaped headlights, semi-spherical radiator, a long and racy hood, distinctive rounded windshield, etc. The body is a straightline type with slanting windshield. The driver's seat is arranged to slide backward and forward to obtain the desired leg room.

Kline-Kar

THE Kissel custom-built Silver specials back of the front seat has been made longer, so the cushions can be lowered, and there is more rake to the steering column, making the position of the driver more comfortable. To accommodate this and not make the tonneau room any shorter, the

wheelbase has been increased to 121 in. The rear spring suspension has been greatly improved by making the lower half 2 in. longer, laying practically flat or straight under load. The upper quarter has been changed from a scroll to a quarter-elliptic without scroll and the connection between the upper and lower spring connected with links, making the rear springs three-quarter elliptic instead of the three-quarter scroll elliptic, which gives 70 in. of rear spring travel. The differential carrier has been ribbed on the outside to eliminate noise. Taper roller bearings in the front wheels replace the straight rollers. Connecticut ignition with automatic switch replaces the Westinghouse. The bodies are now of the bevel-edge type, replacing the rounding type used heretofore. The windshield working on ball bearing stops has been replaced with hinges that have friction stops, eliminating wear and rattle. The rear light in the curtain has been replaced with a bevel plate glass. The wheel size has been changed from 34 by 4 to 33 by 4. The emergency brake has been improved by compounding it from a lever hung from the cross member of the frame and drawing it through an equalizing yoke from underneath the pinion shaft at the housing.

Lexington

LEXINGTON is continuing its 1918 design with only such variations in the superstructure as will improve the car from the standpoint of appearance and comfort. The radiator and cowl on the new touring car have been raised to improve the body contours and increase the power sense in the already symmetrical lines. The top has been redesigned to conform with the later body lines, and plate glass in the rear curtain follows the popular trend. Double-latched coach locks, with outside loop handles, have been added to the doors. The seats have been built into the body sides and are more deeply upholstered. Eight body styles are offered. There has been no change in the chassis itself.

Liberty

THE changes are mostly those in body construction, chiefly in the sedan. The line has been enlarged by the addition of a coupe and a four-passenger speedster. One of the most noticeable changes is in the hood. The number of louvres has been more than doubled, permitting a greater increase in the passage of air around the radiator and engine, increasing cooling capacity, etc. A corrugated black plain walnut steering wheel has replaced the former plain walnut wheel. The sedan is changed in that it is of the four-door type. The body also is roomier, and refinements include a heater, drop steering wheel and rain-vision windshield. The coupe, an entirely new body, is four-passenger. Luggage room is provided in the rear deck, and a parcel compartment is just back of the driver's seat. The new four-passenger speedster supersedes the close-coupled type.

Locomobile

SERIES 38 and 48 are continued with six body types. The chassis are of different wheelbases, 38 being 139 and 48, 3 in.

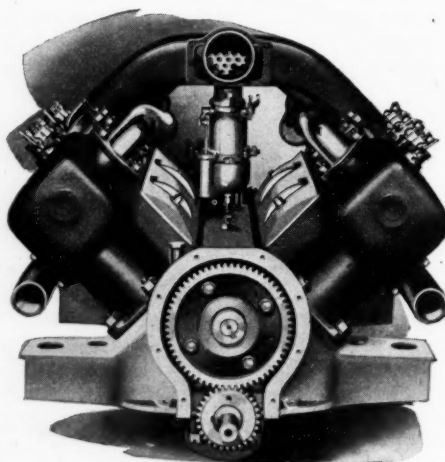
longer. Both are powered by six-cylinder engines, that in 48 having a bore and stroke of $4\frac{1}{2}$ by $5\frac{1}{2}$ as compared with $4\frac{1}{4}$ by 5 for the 38. These models were refined at the beginning of 1918 by a new design of clutch, giving more smoothness of action, the use of the Berling tandem ignition system, reduction of the weight of the reciprocating parts and adoption of the Lancaster crankshaft vibration damper. It is to be expected that the same high class of body construction which marked the line in previous years will be continued.

Maibohm

MAIBOHM has a new line of smart bodies for 1919, using, with a few refinements, the same chassis on which production has been concentrated for two seasons. The phaeton is bevel-edged, with long, low and graceful lines and has wider, deeper and more comfortable seats and real leather upholstery. A touring sedan seating five, with beveled roof edges and with windows that may be instantly lowered or removed, is an addition to the line, as is the brougham, which seats four. The airplane-type engine with overhead valves and counterbalanced crankshaft has an improved channeling of the gas passages and fuel delivery through preheated intakes, permitting the efficient and economical use of low gravity gasoline. The crankcase now takes the new S. A. E. installation of generator, starting motor, distributor and carbureter.

Marmon

THE Marmon line, with various refinements, is continued much the same as in 1918. The aluminum engine, special frame and runningboard construction, graduated rear cross springs, etc., are retained, with body lines that are much the same. The Bijur electric system is used, with a Bosch magneto for ignition. Other small refinements include the plain bearing fanshaft, magnetic tank gage, one key for the switch, gear lever and toolbox lock and glass window in top. The chassis is offered alone for those who want special bodies.



Apperson eight, showing stove and intake manifold

Maxwell

THE Maxwell 25 is continued for 1919 with six body styles. It will have a five-passenger touring body, three-passenger roadster, five-passenger sedan, three-passenger coupe, five-passenger all-weather top touring car and three-passenger all-weather roadster. The berline of last year is not offered. This was a six-cylinder in which the driver's seat was shut off by a glass partition. The company has held fast to its one chassis, and there have been no fundamental changes in this mechanically during the last two years or more.

McFarlan

THIS company specializes in out-of-the-ordinary body construction, covering everything from the touring roadster to the Victoria touring in open cars and from the large limousine to the speeding sedan in closed cars. There are no changes, except for slight ones, in the chassis. The valves are slightly inclined toward the head, making short valve pockets and guaranteeing better combustion.

Mercer

MERCER cars are continued about the same for 1919. The same long, low and thoroughly harmonious lines of the body are retained. The new series is designated as series 4, and it consists of touring, sporting, runabout and raceabout. Only the touring limousine is eliminated from last year. Accessibility stands out all over the powerplant of this car, and it is a pleasure to lift the hood and view the clean exterior of the engine, which, needless to say, is very fast.

Metz

METZ has discontinued the manufacture of a friction-drive car—the last—and is offering a car which will have gear drive and be known as the Master Six. It will be powered with a 45-hp. six-cylinder engine, have three-speed sliding gear transmission, semi-floating rear axle, I-beam front axle and semi-elliptic springs on the rear with Hotchkiss drive. Five tires, 32 by 4, on demountable wire wheels will be used. Electric equipment throughout is standard. The new car will have a wheelbase of 117 in. and weigh less than 2500 lb. Fuel feed will be by the Stewart vacuum system.

Mitchell

MITCHELL enters the 1919 season with a continuation of its D-40 and C-42 models. Each of the chassis models are offered in a variety of body styles. The C-42 ranges from a three-passenger roadster to a town car. The company makes its own engine, which is a six, of 3.25 in. bore and 5 in. stroke, for the D-40 and 3.50 in. by 5 in. for the C-42. The axle in the smaller six is three-quarter floating and in larger car is of the floating type. The same streamline body effects characterize the Mitchell of this year as of last.

Moline-Knight

MOLINE-KNIGHT cars for 1919 will be practically a continuation of the 1918 model. The conventional type of frame has been substituted for the frame which has been used formerly and a Borg & Beck single-plate dry-disk clutch is used in place of the cone clutch. Several refinements in the small details of the car, as well as in its make-up, have been adopted. The V-shaped radiator, which always has been a unique and distinguishing feature of the Moline-Knight, is to be changed.

Monitor

THIS is a six-cylinder car with a wheelbase of 117 in. The engine is a Continental with a bore and stroke of $3\frac{1}{4}$ by $4\frac{1}{2}$. Two body types, a five-passenger touring and a two- or four-passenger roadster, are made. Standard units are employed in the make-up of the chassis. These are the Stromberg carbureter, Dyneto electric, Borg & Beck clutch, Adams rear axle, etc.

Moon

THIS concern will build for 1919 three light sixes, model 6-38, 6-46 and 6-66. Model 6-38 will supplant the present 6-36, using a Red Seal Continental engine with unit powerplant, bevel-lined bodies, etc. The size of the engine to be used in this car will be $2\frac{7}{8}$ by $4\frac{1}{2}$. Model 6-46 will have a $3\frac{1}{4}$ by $4\frac{1}{2}$ Continental, bevel-lined bodies, Rolls-Royce type radiator with a four- and six-passenger body. The third model is the same car built for the last three years, which is to be continued.

Moore

TWO models are made by this concern, a sport car on the same chassis as the other, and model C, which is practically the same except for a few body changes. The wheelbase is 106 in. in this car, but the construction of the frame to extend slightly in the rear gives slightly more leg room than would be expected in view of this. The car is continued practically the same, with an engine of $3\frac{3}{4}$ by $4\frac{1}{4}$ in. bore and stroke. This concern will bring out a new model with a wheelbase of 104 in., 2 in. shorter than present models, mounted on 30 by $3\frac{1}{2}$ -in. wheels and fully equipped.

Nash

NASH is continuing the six, which was an entirely new product with refinements both mechanical and in the body at the beginning of the last year. Simplicity marks the engine, a valve-in-head six with bore and stroke $3\frac{1}{4}$ by 5. The powerplant, as well as the entire chassis, is very clean in design, and there is not an unnecessary rod or cross bar in evidence anywhere. A special means for heating the air and a manually-controlled shutter for varying the amount of incoming cold air are provided. Starting, lighting and ignition is Delco. The emergency brake is on the driveshaft, as well as the speedometer drive. Five body styles will be offered this

year—five-passenger touring, seven-passenger touring, four-passenger roadster, six-passenger sedan and four-passenger coupe.

National

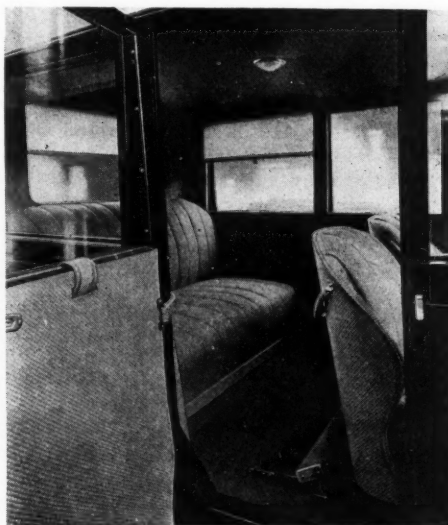
THE National Highway six and twelve are continued for the coming season. The intake system, which is designed to handle very heavy grades of fuel with satisfaction, is retained. The chassis is identical with last season's, one of the outstanding features of which is the long cantilever springs which National has been using now for more than five years. Five body styles are offered on the twelve and four on the six. The speedster is offered only on the twelve chassis, while the touring car, phaeton, roadster and touring sedan are offered on both.

Oakland

THE present car will be continued for some time to come without any changes. This is known as the Sensible Six. Five body styles are offered, coupe, sedan, touring and roadster. The engine is a high-speed, overhead valve type that develops 44 hp. at 2600 r.p.m. with a bore and stroke of $2\frac{1}{8}$ by $4\frac{3}{4}$. Aluminum pistons with light connecting rods reduce vibration without loss of efficiency. Force-feed lubrication is retained. Accessibility as to the engine parts is featured. The sedan and coupe are unusually roomy, with large doors, convenient controls, heaters, permanent pillars, thick upholstery and easily-adjustable plate-glass windows and double glass rain-vision windshields.

Oldsmobile

THIS concern will continue building the two chassis turned out up to the time its production practically was stopped by war demands. These are a six-cylinder and an eight-cylinder. The six has a 112-in. wheelbase on which the ratio of power to car weight is exceptionally high. The crank checks on the crankshaft are so curved that their center of mass is also



Allen sedan tonneau, showing wide windows and overhead dome

their center of gravity, giving a natural running balance. The eight employs Lynite pistons so fitted with rings that the act of oil pumping has been reduced to a minimum. The wheelbase is 120 in.

Olympian

THIS concern, which exhibited its new cars for the first time at the New York show last year, incorporates the features which have been associated with the Brush engineers, such as the valve-in-head engine, deep frame construction in which the side members are formed by the splash apron and the runningboards also are part of the frame structure, the full circle housing on the rear axle and the related features which go with this type of construction. The drive units are made stiffer by a triangular layout composed of two torque arms coming together at their forward ends so an equilateral triangle is formed by the two torque members and rear axle. The bodies are mounted on a 112-in. wheelbase and are typical of expression in economy of space. The powerplant is composed of a four-cylinder engine, Borg & Beck clutch and three-speed ball bearing gearset mounted as a unit.

Overland

THE model 90 Overland is being offered this year with no material changes. The Overland four-cylinder block-cast engine having a bore of $3\frac{3}{8}$ in. and a stroke of 5 in. is the only poppet-valve engine the company is making at the present time. Two body styles are furnished on this one chassis, a five-passenger touring and a five-passenger sedan.

Owen-Magnetic

THE 1919 Owen-Magnetic is of the wide bevel, cubist design. Refinements have been made but no special features added. The electric brake switch in the floor in addition to the electric brake on the control handle makes the Owen-Magnetic most sensitive as regards braking. When a stop is necessary the control handle may be thrown from high into neutral position and the foot lever depressed, which takes effect immediately. This reduces the speed of the car automatically, and with the foot brake the car may be stopped very quickly. In front of the radiator a splasher has been designed, which blends into the two side members of the frame. The magnetic transmission is, of course, a paramount feature. Minor improvements have been made, but the unit is practically the same as in previous models.

Packard

PACKARD has not brought out any new models for 1919. The chassis models 3-25 and 3-35 are being continued with a few minor changes. The body designs have been changed slightly, giving a lower appearance. The hood and body blend together without a break or bulge, straightline effect continuing from the radiator to the rear of the body. Visible door hinges are still employed and serve to

relieve the monotony of the straight lines. The 3-25 model is offered with seven styles of bodies and the 3-35 with six, which are all seven-passenger. Mechanically, the car is the same, the famous Twin-Six features being retained. The Bijur motor and generator with the Delco ignition system and the Willard battery make up the electrical equipment.

Paige

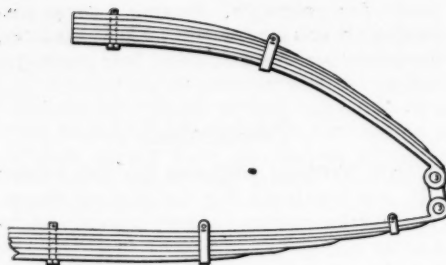
THE Paige cars offered this year are better looking, a little richer in outward accessories and considerably refined in mechanical features, such as lubrication, power and better quality of material. The rear windows in the tops are plate glass in metal frames and not the well-known five small isinglass windows which have distinguished Paige cars for the last seven or eight years. The Larchmont sport type has an oblong glass with the corners slightly rounded and goes very nicely with the general straightline effect of the body and the top on this model. The Essex model, with its streamline body and distinctive curve in the back panel, has a window with straight sides and ends of sweeping half circular curves. The five-passenger model Linwood is fitted with an oval glass somewhat smaller than the other two, but in proportion to the car and suited to it. The top itself has been very much improved in appearance by adding the gypsy sides to the back curtain, similar to the style used in the Essex model the last year or more. The mechanical features that improve the efficiency of the Paige cars consist of better-designed pistons, better made piston rings to insure good compression and freedom from oil passing up into the combustion chamber, as well as stopping the gasoline passing the rings and entering the oil in the crankcase, due to the very low grades of gasoline now in use.

Paterson

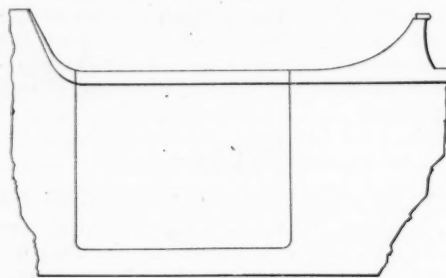
THE Paterson sedan which was announced in 1918 is not being continued this year. However, the five and seven-passenger touring car and the four-passenger roadster are continued. The chassis has a wheelbase of 120 in. and uses a six-cylinder Continental engine of 3½ in. bore and a stroke of 4½ in. The Delco starting, lighting and ignition system is used. The stock color of all bodies is blue, with color options of gray and maroon.

Peerless

THE same chassis model that was used last year is being continued for 1919. The engine is eight-cylindere, cast in fours and suspended from three points. The Auto-Lite starting, lighting and ignition system is used. The generator is located in the center of the V and to the front. The wheelbase of the one chassis model is 125 in. and all bodies are fitted to this chassis. The bodies include a seven-passenger touring, four-passenger roadster, four-passenger coupe, seven-passenger sedan and a seven-passenger sedan-limousine.



The rear spring suspension on the Kline-Kar has been improved by making the lower half 2 in. longer, laying practically flat under load



The distance from the dash to the back of the front seat on the Kline-Kar has been lengthened, making for more comfort for the driver

Phianna

THE Phianna is a very luxurious car, selling for \$5,000. One standard chassis is built, upon which are fitted special custom-made bodies to suit the taste of the purchaser. The company makes its own engine. It has four cylinders, bore of 3½ in. and stroke of 6 in., and is fitted with a 1½-in. H. & N. carbureter. The gearset has four forward speeds and the rear axle ratio is optional. Both brakes are internal expanding type. The wheelbase is 128 in., and the wheels are 32 in. in diameter. Ignition is by a Bosch magneto.

Piedmont

PIEDMONT offers for 1919 a four-cylinder and a six-cylinder chassis. Each chassis has a club roadster body and a five-passenger touring body. The four-cylinder engine is block cast and has thermosyphon cooling. The wheelbase of the small car is 114 in. Starting, lighting and ignition is with a two-unit Dyneto set and a Willard battery. The six-cylinder model has a wheelbase of 120 in. and is powered with a Continental engine whose bore and stroke is 3.25 in. by 4.5 in. The starting, lighting and ignition of this model is with a Remy set and a Willard battery. The engine is fitted with a Zenith carbureter.

Pierce-Arrow

THE new dual-valve six-cylinder engine is to be offered with six body types. With this the car speed is much greater and the mileage per gallon has increased. The engine develops 40 per cent more maximum power and 30 per cent more efficiency than the previous engines. The wheelbase of this chassis, which is known as B-5, is 142 in. Naturally, the high-class finish and complete equipment of the line are retained.

Pilot

A SEDAN and coupe of the solid-built body style will be offered this year for the first time, those of 1918 being of the demountable type. The chassis is continued with no changes. This is fitted with a Teetor-Hartley six-cylinder engine with a bore and stroke of 3½ by 5. It has a wheelbase of 119 in. Other standard units such as Tillotson carbureter, Borg & Beck clutch, Hartford universals, Hess rear axle, C. A. S. steering gear and Delco ignition are employed.

Premier

THE same chassis model as was used in 1918 is continued for 1919 by Premier. The aluminum, block-cast, six-cylinder engine is being used without any changes. Three body models are mounted upon the chassis, a seven-passenger touring, a four-some and the seven-passenger sedan. Delco equipment is used throughout. A high-capacity Willard battery is furnished because of the electric gearshifting device that is employed.

Reo

THE present models of this company do not contain any changes of a mechanical nature of particular consequence to the trade right at this time. Two chassis models are made. Four body styles are offered, five-passenger touring, three-passenger roadster, four-passenger coupe and five-passenger sedan. A four-cylinder engine is used. This has a bore and stroke of 4½ by 4½. It develops a horsepower, N. A. C. C. rating, of 27.23.

Revere

IN addition to the Duesenberg engine used in the past, Revere has brought out and will use in a great many of its cars in 1919 an engine of its own. This uses a horizontal valve; the rocker arms are 4 in. The front assembly is patented by Revere. It has spiral gears and does away entirely with the fan belt. The master head used also has gears to take care of the starter, generator, oil pump, camshaft, and, in fact, everything is centered on this master head driven by spiral gears. The object of this is to have the engine very quiet and still use a small horizontal valve to produce great power. The engine is a 360 cu. in. and develops about 105 hp., Revere says. The gasoline tank is patented. It is built around brackets, bolted to the rear cross member of the frame. The rear spring is 58 in. long and 2½ in. wide. No other changes have been made of any importance.

Roamer

SEVEN body styles are offered in the Roamer line this year. These are fitted to a chassis with a wheelbase of 128 in., which uses a Roamer-Continental engine. Special coach-built bodies are available. Thermostatic control has been adopted, whereby the water is held from circulating through the radiator until it has reached a good heat, opening and closing of the thermostat valves being governed

entirely by the heat of the engine. The exhaust is carried to the rear of the car through seamless tubing, and the brakes are operated from a double rocker shaft. The torque of the axle is carried through a heavy stamped steel torque member suspended by a buffer spring at the center cross member.

Sayers

THE most recent announcement of this concern is a light six made of standard units and weighing, equipped for the road, about 2600 lb. There is nothing radical in its construction. The design is established all the way through, for the company has been building chassis for different purposes for ten years. The body is five-passenger, with long, graceful lines. It has center cowl and French pleated upholstery. The chassis is black and the body ultramarine blue. The engine is a Continental six with Delco ignition, starting and lighting.

Saxon

THE model Y-18 is continued with several changes in the way of refinements. The gas tank has been changed from the cowl to the rear of car, and a Stewart vacuum tank is used. The tire carrier is reinforced. In addition to the standard blue color, the touring cars are offered in maroon and English gray as standard. The four-passenger, six-cylinder roadster comes in the standard dark blue or beaver brown with white wire wheels. Both carry the gypsy curtain with rear plate-glass windows in the rear. The upholstery is of genuine leather of the pleated type which is easy to keep clean and has long life. The side curtains are of the quick-acting type, carried in envelopes in the top, and may be easily removed or replaced. Leather pads are placed on all doors, keeping them from being soiled.

Scripps-Booth

THERE have been no real changes in the Scripps-Booth cars for 1919. Two new body designs have been added, a five-passenger sedan and a four-passenger coupe. A three-passenger roadster and a five-passenger touring car are continued from last year. These two cars are leather upholstered, and are fitted with lined pantasote tops and curtains that open with the doors. All models are mounted on the same chassis, the powerplant of which is six-cylindere and of the valve-in-head type, the bore and stroke being 2 $\frac{1}{8}$ in. by 4 $\frac{3}{4}$ in. The wheelbase is 112 in.

Seneca

A FEW changes made are two universal propeller shafts. In connection with this is a torque arm. The front wheels are equipped with Bower roller bearings in place of the cup and cone type. This change has required a larger hub cap and hub, which presents a massive appearance. Seneca has adopted the Remy new-type ground distributor and coil, which is a considerable improvement over the old type.

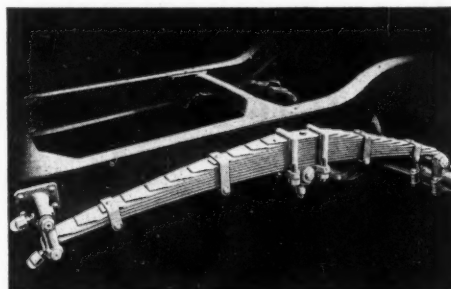
Capacity of the gasoline tank has been increased to 12 gal. There are a few other changes in the upholstery and installation which has added considerable to the car. One of the biggest features advanced for this car is the gasoline economy, which, in connection with the oversize units of construction, gives the car an exceptionally low maintenance cost.

Singer

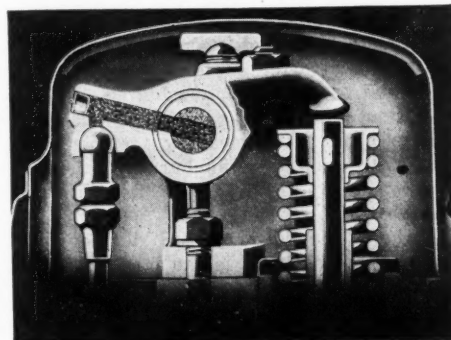
SINGER manufactures a high-priced car and is presenting a new series 19. The chassis has a 139-in. wheelbase, a six-cylinder Herschell-Spillman engine, whose bore is 4 in. and stroke 6 in. The Bosch magneto is used for ignition, and Westinghouse motors and generators for the two-unit electric system. The bodies supplied with this chassis are a seven-passenger touring, a four-passenger touring, a five-passenger brougham, seven-passenger limousine, six-passenger sedan and a two-passenger roadster.

Standard

NO change has been made in the Standard for 1919. Six body styles are offered. The chassis is fitted with an eight-cylinder engine with a bore and stroke of 3 $\frac{1}{4}$ by 5 in. The engine is a Herschell-Spillman which develops a horsepower, N. A. C. C. rating, of 33.80. A Zenith carburetor, Borg & Beck clutch, Grant-Lees gearset, Timken rear axle, Spicer universals, Westinghouse starting and lighting and Splitdorf ignition are used.



Cantilever spring on Buick. The length of the rear springs has been increased 2 in., and the design such that rear end of the car has been dropped, improving riding qualities



Wick lubrication of rocker arm and pushrod connection on Buick. The overhead valve construction can be seen, as well as the adjustment feature for the valves

Stearns

STEARNS has discontinued the manufacture of its eight-cylinder for a while until the shortage of material has been relieved. The four-cylinder model is continued, however, with one or two changes and refinements. The touring car no longer has the divided front seats. A Victoria top with the extended hood to cover the front seats has been substituted for the old-style top, and it is equipped with beveled plate-glass side and rear windows. Leather upholstery is used, and the body color is the Stearns green. The 12-volt Remy starting, lighting, and ignition system is used. Two bodies are fitted to the same chassis, a four-passenger roadster and a five-passenger touring car.

Stephens

STEPHENS is introducing for 1919 a new four-passenger touring car. This car has a very low hung body and, because of the rear seat holding two passengers, the body is rather narrow, which gives it a fast appearance. A California top, like a Victoria top, except for the extended hood over the front seats, is a feature of this car. Refinements in all the models have been made, some being: The new position of the tool kit, located in the side pocket of the front door; a comfort touring kit in the pocket of the other front door, and tonneau lights which light up when the rear doors are opened. The Root & Vandervoort engine is used on all the models. This engine is of the valve-in-head type, with the intake manifold cast within the cylinder head and having direct access to the valves.

Studebaker

THIS line is continued with only minor changes. The top on the light four touring car has been changed so it is identical in design and construction with the top on the light sedan seven-passenger six. The chassis construction of all three models is the same. There are a few minor changes in the bodies, such as the finish of the instrument board and back of the front seat of the seven-passenger six, which will be Circassian walnut instead of mahogany. Instead of having a lock on the glove box in the rear of the front seat on the seven-passenger six, this glove box will simply have a knob and catch. The outside and inside door handles of the big six have been changed slightly, as has the robe rail of the seven-passenger six. These cars were brought out entirely new for last year and as the company has been so deeply concerned with war work they will figure in a way as among the new cars for 1919. They are featured with a gracefully rounded radiator from which hood and body are molded in a straightline effect, the seven-passenger having an additional touch of elegance in a neatly beveled edge extending entirely around the body.

Stutz

ALL the 1919 models have the sixteen-valve engine, which is the same as has been used in 1918 and the latter part of

1917, this being the third year for the building and use of this engine. As usual the Bearcat is offered as well as a new type of close-coupled four-passenger, equipped to carry five persons and a six-passenger which is equipped to carry seven. The exceptionally roomy two-passenger roadster remains in the line. All are mounted on a 130-in. wheelbase, with the exception of the Bearcat, which carries a 120-in. wheelbase. The changes are very few, fenders and runningboard being slightly heavier, all models having Rudge-Whitworth wheels, splash aprons, in front of the radiator, more slant to the cushions give an easier riding position, and also higher back for the passengers. The lines are carried out practically the same as in 1918, the conventional right drive having been retained. All bodies have curtains opening and closing with the door and of special design.

Templar

THE Templar cars are offered this year with little or no mechanical changes. Refinements, however, in the bodies are in evidence. A very complete equipment is furnished with the car, which includes such things as a Boyce Moto-Meter, windshield cleaner, tire pump, eight-day clock and winter-type side curtains. The body styles offered are a four-passenger sportette, a five-passenger touring, a two-passenger and a five-passenger sedan.

Tulsa

THE Tulsa car comes as a five-passenger touring, a two-passenger roadster and an Oil Field roadster. Each car comes with

two color options, green and maroon, blue being the stock color. Single ignition from the Delco system is used, the motor and generator being of the two-unit type and Dyneto make.

Velie

VELIE Biltwel sixes for 1919 reveal a decided improvement in body design and in details of equipment and specification. Seven body styles are now available, six of these on the same type chassis; the seventh, a sport model, on a larger, more powerful and speedy chassis. These bodies have distinctive lines. The closed cars are upholstered in mohair and whipcord; the open cars in deep plaits of real leather. There are many noticeable refinements in the construction of the car, plate-glass windows, curtains opening with the doors, and mahogany instrument panels, longer control levers and the like. The model 38 chassis has a Continental Red Seal engine, Timken axles, Borg & Beck clutch and other standard units. A touring car, roadster, sedan, coupe, cabriolet and town car may be obtained on this one type chassis. The model 39 chassis, carrying the sport model, is specially designed. The exhaust pipes extend through the hood and to the rear in a long graceful sweep, lending a very interesting appearance to the entire car. Short runningboards displace the customary full length equipment. All electric wiring is inclosed in metal conduits with protecting fuses on each circuit.

Westcott

WESTCOTT has made minor changes in its new model S-18-A, among which is a reduction in the size of the tires from

35 by 4½ to 32 by 4½. A varied list of body styles on the one chassis type are presented and are as follows: Seven- and five-passenger touring cars; liberty green in color; four-passenger roadster, blue or green in color, leather upholstered; five- and seven-passenger sedans, gray or blue, cloth-finished interiors, and a four-passenger coupe finished the same as the sedans.

Willys-Knight

WILLYS-KNIGHT is being continued practically the same as it was in 1918. The Willys-Knight engine is four-cylindered and has a bore of 4½ in. and a stroke of 4½ in. A 1¼-in. Tillotson carbureter is used in conjunction with the vacuum feed. The wheelbase of the Knight engine chassis is 121 in. This chassis is fitted with four styles of bodies, a seven-passenger touring car, four-passenger coupe, seven-passenger sedan and seven-passenger limousine. The Overland bodies are unmarred by angles or projections. The built-in windshield conforms to the curve of the cowl. The foot brake and clutch pedals are adjustable and all controls are within easy reach.

Winton

NO changes have been made in the Winton models, because the company was very busily engaged on war work most of 1918. Also, it is not a policy of the company to bring out new models each season. On the other hand, it is more inclined to adopt any changes that are found advisable as soon as arrangements can be made to put them through the factory.

Prospects for Tractors During Year 1919

Relative Economy of Machines to Fore

DESPITE all the hampering restrictions which were placed on the tractor industry, considerable progress has been made during the last year. Probably progress has been more in the direction of determining the conditions upon which tractors must be sold and in determining the character of service which must be rendered upon them than in any other direction. Nothing radical has occurred in the way of designs beyond the appearance of two or three machines which have secured a large distribution and the adoption of accessory parts which seem destined to assume considerable importance in the future.

Of course, the usual number of new tractors have made their appearance, but with the exception of two or three of them none has attained sufficient of either production or distribution to warrant assertions regarding their permanency. Some of these new machines look very good and probably will take their proper place in their respective classes when once they are produced in quantity. Others have a much more doubtful future before them.

As far as the old established lines are concerned there have been few departures from conventional types. Some new models

have been introduced. International Harvester added one; Case, two; Allis-Chalmers, two; Hart-Parr, Advance-Rumely, Port Huron, Aultman-Taylor, the Minneapolis Steel & Machinery Co., and some other concerns have increased old lines by adding a small agricultural tractor.

In the accessory line there has been a general adoption of an air cleaner of some kind for tractors which will be used primarily for tillage operations. A decided innovation was the adoption of the electric control and starter device on the Moline-Universal. Another innovation was the installation of a starting device on the Lauson tractor. Thermostatic temperature control to facilitate the burning of kerosene on the Case tractors also deserves mention in this connection.

Perhaps the most marked development of the year just past is the large increase in production of small tractors, machines whose capacity is measured by the two-bottom, 14-in. plow. This was largely due to the appearance of the Fordson, in the four-wheel class, some thousands of which have been sold. In the two-wheel class the new Moline-Universal is notable, not alone for the versatility it has displayed on the farm but because until late in the season

it was the only representative of its type on the market. There are one or two others now embodying the same principle, but they are smaller, lighter and cheaper machines than the Moline.

Late in the year the announcement was made by General Motors that it was building a two-bottom machine which would be in production early in 1919 and which would sell to the farmer at a price lower than that of any other four-wheel machine of like capacity on the market.

This presages an interesting situation for 1919, namely, a contest for popularity and economy of operation between the small two-bottom tractors and machines of larger capacity. It is estimated conservatively that the output of tractors for 1919 will be in the neighborhood of 200,000. Present indications appear to warrant the belief that nearly half of these will be of two-bottom capacity.

The question then which will come to the fore in 1919 in tractor trade will be the determination of the relative economy of two-bottom and three-bottom tractors. In other words, it is to be determined whether the factor of economy is in the capacity of the machine or in the skill and versatility of the operator.

Chicago Schools Will Train Mechanics

Board of Education and Dealers Co-operate

CHICAGO, Jan. 17—Motor car mechanics will be trained in a school now being established by the Board of Education of Chicago. This school will operate upon the continuation plan, the students attending two half days a week and the school being run continuously. The purpose of this school is to train and educate men and women in the proper maintenance and operation of motor cars, trucks, and other automotive apparatus; in other words, this is to be a trade school. Men from the service stations, garages and repairshops are sought in particular. However, this does not mean that persons of other vocations are not eligible. On the contrary, the purchaser of a new motor car who wants to learn the construction of his car will be urged to attend as time permits.

Value of Schools

The value of schools of this character cannot be estimated in dollars. Its teachings will go a long way toward the reduction of accidents by the motorist due to his ignorance of the car's mechanism and its limitations. The men who conduct the motor car business of Chicago are so in favor of the proposition that they are go-

ing to send employees from their service stations and their repairshops to this school and will pay the men while attending school. At present the plan is to get the greatest proportion of the attendance from these sources.

The school will be near the center of Chicago's motor row. An old high school building, which has been used by the Government for a similar purpose in the training of mechanics for the Motor Transport Corps and mechanical divisions of the Army, will be used. A valuable and suitable collection of machinery and other equipment is on hand, and this will be available for the new trade school.

The dealers of Chicago are developing the organization plans for the school, and the Board of Education at present is furnishing only the money, the building and the equipment. Edwin V. Cooley, principal of the continuation schools for Chicago, is in charge of all the organization plans. Since this will be a trade school for motor mechanics it seems entirely logical that men affiliated with the motor car business can develop a better organization for a school of this kind than could the Board of

Education.. A dealer is in a position to realize the tremendous importance of a school of this nature and the Chicago dealers do, as shown by their co-operation with the school board. In a meeting held by the dealers of Chicago and other men connected with the industry it was unanimously expressed that the dealers would be in favor of increasing a man's salary after having completed a course in this school.

Plan of Study

The plan of study outlined includes English, drawing, mathematics, chemistry, physics and mechanics in general, each of these with reference to the motor car. The subject of mechanics will include all units of the car. There will be classes of carburetion, ignition, starting, lighting, mechanics of the engine, of the transmission and of the differential. Enrollment in the school is for no specified time, students are free to come for one, two or three months or more, but when attendance is once started it must be regular. Classes for advanced students will provide opportunity to continue work.

How to Make Farm-Lighting Appeal Tell

Dealer's Message Necessity and Convenience

ANY man selling isolated farm-lighting plants should be intimately acquainted with the mechanical features of the light he is handling, for there is the ever-present danger of dwelling too much upon how well a certain part is finished, how simple this switch is constructed and that governor designed, all of which may lead a potential buyer to get an idea that basically all farm-lighting plants are complicated, and on that ground pass them up.

Message of Necessity

The message the salesman must carry to his prospect is the necessity and convenience, together with the almost unlimited service to be derived from such an installation. He must make the farmer visualize the comfort and labor-saving obtained from the use of an isolated lighting plant. He should go over the farmer's premises with him and show just where the plan could be installed; how the big cow barn should be wired up; how the milk house and other outbuildings could be equipped with overhead shafting for driving cream separators, etc. In addition, he should go through the farmhouse with the farmer and his wife, showing how the installation could be made, what sort of fixtures would be best, where the plug for attaching an electric iron should be placed in the kitchen wall. There is no end to telling about the accessories, such as vacuum cleaners, toasters, percolators, etc., that need not be purchased at the same time the plant is installed but added a little at a time. The big idea is to show

that once the house or barns are wired for electric current, practically all the conveniences in the modern city flat are brought to the farm.

Essentially there are two classes of isolated farm lighting plant prospects with whom the dealer must talk. First, we have the man who realizes the value of electric light and power on his farm, the comfort it means to all his household; in fact, a progressive man who believes in tractors, phonographs and card index systems. Such a man is not hard to sell.

Then there is the man who figures everything in dollars and cents. With him you must use different tactics. You must bring to the front all the knowledge of arithmetic you possess and show him just how much the light plant installation is going to save him, so far as money is concerned, and then follow this up with the time and energy saved in simply turning a switch at all hours of the night or day for light and current.

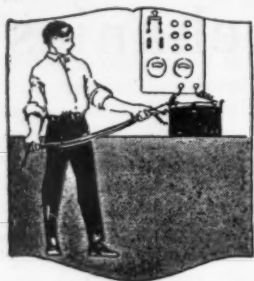
Before going out to a prospect it is a mighty fine thing to know just how you are going to approach him; whether the discussion is likely to be along technical or other lines. Some of our farmers to-day are pretty well versed in things mechanical and electrical, and it is poor policy for a farm-lighting salesman to match wits with such a prospect unless he himself is up to snuff on what he is trying to sell.

There is one angle to the farm-lighting selling proposition that is not played up as much as it might be, and that is the

health question as regards using the old-fashioned kerosene lamp. Such a contrivance consumes a great deal of the oxygen in the room, a state of affairs entirely foreign to the electric light. This means, then, that the salesman can point out to his prospects that they will get not nearly as tired or sleepy with electric lights in their rooms as with the lamp. Also, there is the brighter light, all of which facilitates reading, sewing or anything else, which the dingy oil lamp does not always do. The same chemical potential energy of kerosene put in an oil lamp will produce anywhere from three to four times the light when consumed in the engine of the light plant as when burned in the lamp, to say nothing about eliminating danger from fire and doing away with the daily drudgery of filling the lamps, cleaning the chimneys and trimming the wicks. This is not only true of the lamps used in the house but the lanterns for the barn. It is safe to figure that at least ½ hr. is spent every day on the average-sized farm cleaning the lamps and lanterns. That means 3½ hr. every week, which is about the length of time needed to look after a good lighting plant for about four or five months.

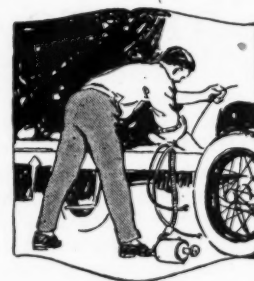
Must Hammer Away

These are some of the things the salesman should hammer away at, because the average farmer will get such arguments quicker than when told that an armature wound in this direction is much better than one wound in the other, etc.



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the 130th installment of a weekly series of articles begun in MOTOR AGE, issue of June 29, 1916, designed to give the repairman and motorist the knowledge which will enable them to care for and repair any and all of the electrical features of the car, no matter what make or model it may be.

The first half of this series has been published in book form by the U. P. C. Book Co., Inc., 243-249 West Thirty-ninth street, New York, and is sold at \$2.50. The remainder of the series will be published as a supplementary volume.

Part CXXX—Bijur Electrical Systems

SEVERAL different types of electrical equipment for the motor car have been made by the Bijur Motor Lighting Co. during the last few years, and a brief description of the main characteristics of each of these systems and what might be called a typical installation will be given in the following paragraphs.

Third-Brush Regulation

Bijur generators with third-brush regulation have a shunt winding, and the output is regulated by the third-brush method. An electromagnetic cutout with two windings, a series and a shunt, is connected in circuit between the generator and the storage battery and automatically connects and disconnects the generator and the battery. This cutout is mounted in the commutator end of the dynamo. The cutout may be exposed for inspection and adjustment by removing the brass band from around the generator. The internal connections of the generator are shown in Fig. 670.

Only two wires lead from the generator, as shown in the diagram, and they run to the storage battery through a junction block and fuse block located on the engine side of the dash. The generator is reversible, and connections may be made to the generator without any regard to the polarity of the lines. If the wrong connections are made, the generator automatically

will assume the correct polarity to charge the storage battery. The battery and generator always should be connected so the battery indicator in circuit will show charge when the battery actually is charging and discharge when the battery actually is discharging.

On one end of the generator is an aluminum housing held in place by two screws. This housing protects a glass-enclosed fuse connected in the shunt field circuit as shown in Fig. 670. The generator never should be run with the storage battery disconnected unless this fuse is removed first.

Electromagnetic Regulation

Bijur generators with electromagnetic regulation have a shunt field winding, and the resistance of the field circuit is varied intermittently in value by a special regulator. The winding of this special regulator is connected across the terminals of the generator and the current in the winding varies directly as the voltage of the generator. The action of the regulator is such that it tends automatically to maintain the voltage of the generator constant.

An automatic electromagnetic cutout is mounted in the same housing with the automatic voltage regulator. In some cases the cutout and regulator are mounted inside the generator housing, and in some cases they are mounted in a housing on top of the generator as in Fig. 671. The housing containing the cutout and regulator, usually spoken of as the regulator box, is held in

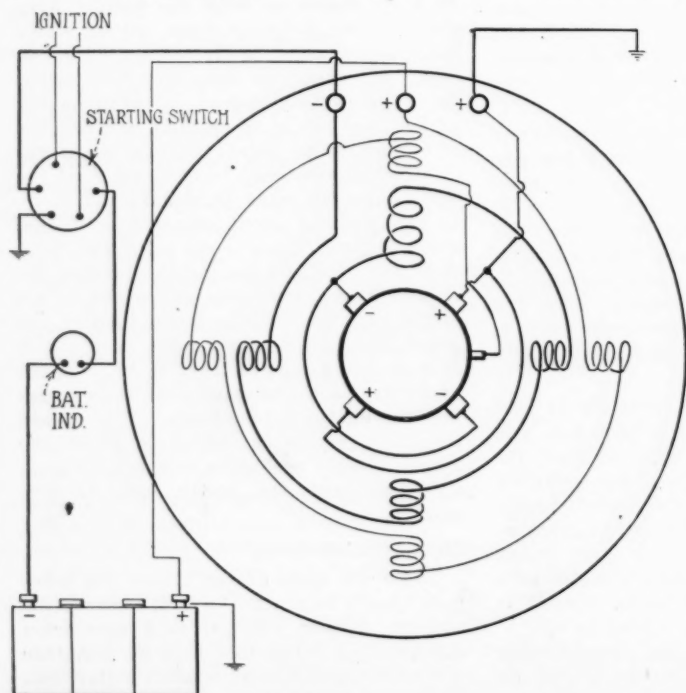


Fig. 670—Internal connections of Bijur third-brush generator

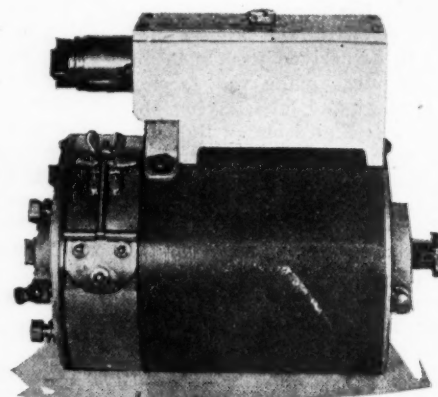


Fig. 671—Bijur generator with regulator mounted in aluminum box on generator

place by a special knurled screw. Projecting from the rear of this box, or from the end of the generator housing when regulator and cutout are mounted inside the generator and fitting into a receptacle, is a disconnecting and reversing plug.

The Motor Car Repair Shop

Practical Maintenance Hints

Connecting-Rod Mandrel

THERE are times when it is necessary to scrape a connecting-rod bearing when it would not pay to remove the crankshaft. Such a condition arises when a single bearing becomes badly scored so that it must be replaced or scraped anyhow. Under these circumstances the work may be quite satisfactorily done on a mandrel which is just the size of the crankpin. The mandrel should be flattened slightly at one end, so it may be held in a vise without difficulty.

Piston Rack

A rack for holding pistons when they are removed from the car not only protects them against accidental injury but also keeps the bench tidy. The one shown consists of a strip of bar stock bent to shape and with a row of pegs across the top to engage the wristpin holes. The pegs should be about $4\frac{1}{2}$ in. apart and there should be at least eight of them, if not twelve.

Towing Pole Safer

In towing a car with a rope there is always the danger that some unforeseen circumstances will arise which will force the driver of the rear car to run into the front one. Not only is there the resultant damage to consider, but also in case the driver of the disabled car attempts to avoid an accident by steering to one side it is quite possible for the side pull to tip the front car over, let alone other disagreeable possibilities.

A towing pole eliminates these difficulties and every service car should have one. When a pole is used it would be difficult for even the veriest tyro, nervous and rattle-brained, to cause trouble at the wheel of the car being towed. The pole shown consists of a piece of hardwood about 4 by 4 in. and 10 ft. long. There is a metal fitting at one end with a square recess to receive an I-beam front axle. It is provided with a hinge which is locked in place with a large cotter pin. There is a similar fitting on the other end to take the circular rear axle section of the tow car.

Proper Plug Length

Dealers selling accessories—and motorists buying them—should always be particular about lengths of spark plugs and to see that they are suitable for the particular engine in which they are to be used. Perhaps $\frac{1}{8}$ in. difference one way or the other will not have material effect in the functioning of the engine, but where there is $\frac{1}{2}$ in. it will, and particularly so if there is a difference in the length of any two plugs.

The bottom edge of the plug, to be cor-

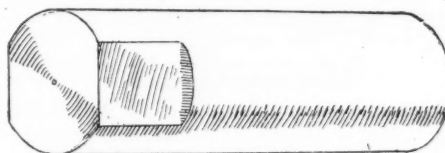
rect, should come to the exact edge of the combustion chamber and should not, under any circumstances, except in an emergency case, extend below it or be short enough to hide the points half way up in the plug hole.

Herewith is shown three ways that plugs are often found. At A it will be seen the plug barrel is decidedly short, thus preventing the spark reaching the body of the charge and making, to some extent, lag in propagation of the gases. B is quite the opposite, the plug in this case being decidedly too long and making it possible for

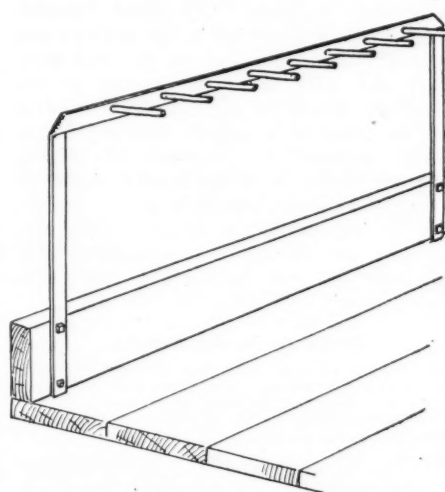
the head of the valve to hit the points when the valve is fully open.

The correct length is shown at C. This length permits the spark to take place in the gas volume, does not permit pocketing, keeps cleaner and at the same time is in no way liable to be injured by the valve in its operation.

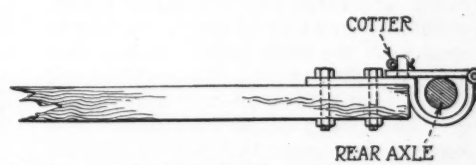
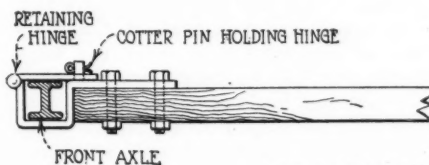
The motorist, by a little experimenting, should determine the make and length of plug that is best suited for his car, just as he knows the right bulb to use to meet the requirements of his lighting system, and then always ask for that particular plug.



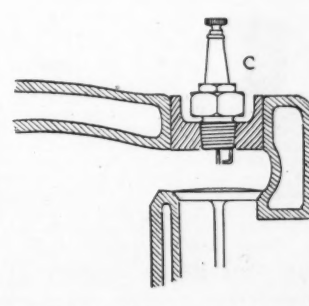
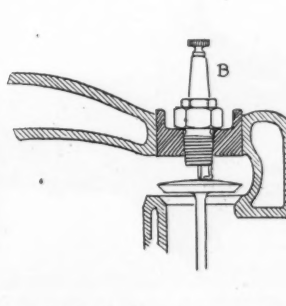
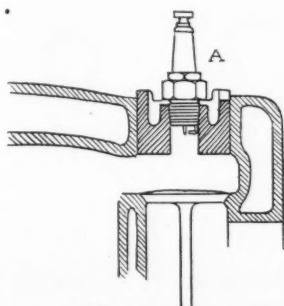
Mandrel which is just the size of a connecting rod



Rack for holding pistons which have been removed from car



How a pole for towing cars can be constructed



Three ways that plugs often are found—A, barrel short; B, barrel long; and C, correct length

Noisy Starter Trouble

When a starter becomes noisy it is high time to look for trouble. Prompt attention may prevent some little difficulty from becoming serious. A noisy starter may be caused by broken or badly worn teeth, a bent armature shaft, a loose armature bearing, or teeth badly meshed.

Striking the Curb

It is always a temptation to strike the curb with the front wheels when pulling alongside, but it is hard on tires. First, because it scrapes the sides of them, perhaps causing them to give out prematurely, and, second, because the impact may throw the wheels out of true, thus causing rapid tire wear.

When parking a car at an angle to the curb it is still more undesirable to strike the curb. The sharp edge of the curb may flex the fabric in the tread so severely that a few strands will break, and with this beginning a blowout will develop. Furthermore, there is the possibility of throwing the wheels out of true.

The Readers' Clearing House

Questions and Answers

Conducted by B. M. Ikert

Taking Up End Play

Q—Where do I look in a 1015 Ford car to take up the end play of the crankshaft, which I think is excessive?—John B. Faisant, Depew, N. Y.

The only way end play on a Ford crankshaft can be taken up is by fitting a new rear main bearing cap.

Function of Cut-out

Q—What is the value of a cut-out?—F. J. Daugherty, Stevensville, Mont.

A cut-out used in any system is for protective purposes. If the engine speed dropped so low as to prevent the generator from charging the battery, then the current from the battery would flow back through the generator and probably would burn out the windings, owing to the low resistance of the latter at slow speeds. Consequently an automatic switch or cut-out is inserted in the circuit to connect the battery with the generator when the speed of the latter reaches a certain point and to disconnect it as soon as it falls below that value. In other words, it is to prevent the battery current from reversing through the generator and handles it automatically.

Setting Up Bearings

Q—Is it necessary to set up a small bearing, such as a Ford, tighter than a large one?—Oliver Sveen, Lake Mills, Iowa.

Taking it for granted that you mean a crankshaft bearing, it may be said that general practice commands that a bearing have a snug yet free fit, whether large or small. A bearing is supposed to be correctly proportioned for the engine, and thereby the practice would be the same in either case. But it is a fact that the same amount of pressure on a nut on a small bearing as against that on a large one would tend to warp the bearing in the smaller one. It is a case of using discretion. After a bearing has been completely scraped and fitted and the shims placed, it should be drawn up so that it can just be turned with the hand crank. Before final assembly, however, the mechanic should see that each part is given a liberal coating of lubricating oil; because to assemble a bearing dry means that the oil will not

Miscellaneous

find its way between the wearing surfaces, no matter how much is there.

When the car has been run a few hundred miles the bearing should be looked after, and in all probability one or more shims can be removed, for there will come a certain amount of compact in the shims, the bearing metal and the nuts and studs will stretch a little and a loose bearing will develop. But after the second adjustment you may be sure the bearings will need no attention for a long time unless they are neglected in the matter of oil.

When Axle Key Shears

Trenton, Mo., Editor MOTOR AGE—Am enclosing a sketch of a method of running a car to a garage after the key in the rear has been cut. When you shear the key in the outer end of the rear axle, take the ordinary adjustable wrench which is always carried in the toolbox and tighten it upon the nut on the end axle-shaft and wire it to the spokes of the wheel as shown in Fig. 2. This enables you to drive to a garage and get it repaired without the expense of having your car towed in or the inconvenience of a long wait or a delayed trip.

It is impossible to reverse your car, but any car having a semi-floating rear axle may be run indefinitely with this simple repair.—Webster M. Wright.

Bearings in Rear Axle

Q—I have trouble with the thrust bearing in the rear axle breaking. The main bearings have no shims. Would it be wise to fit new bearings while overhauling?—W. E. Brown, Penalsas, Kan.

If the thrust bearings in the differential of your car do not hold up, it is probably because the axle housing has sagged, permitting them to become out of alignment. This can be remedied by taking up a portion of a turn of the turnbuckle on the truss rod under the back axle. It may also be that the adjustment of the bearing has not been correct and that it has permitted it to pound itself out of shape. In Fig. 1 will be found

an illustration of a portion of the rear axle—the part that carries the two bearings that support the driveshafts and which is attached to the main axle housing on the front side. By removing the back cover plate of the axle housing you will be able to see the differential and get at the adjustment of the two differential bearings. The adjusting ring A screws into the threaded portion at B and is held from loosening or tightening by the nuts E. The bearing D rests within the race C and the latter over the driveshaft, which is not shown but which readily will be seen when the inside of the housing is disclosed by removal of the cover plate.

These are not what are known as thrust bearings but, being of the roller type, are designed to carry the load and also to take the thrust. They are not destroyed readily and only bad misalignment would cause them to go to pieces. By having the axle jacked up so both wheels may be revolved it may be seen whether the driveshafts run true or whether they are out of alignment. If the latter, it means first to true up the axle housing by the truss rod turnbuckle and then adjust the bearings by the adjusting ring A, turning to the right to tighten and to the left to loosen, after having loosened the nuts E.

There should be no shims under the main bearings, because this is cared for in the making of the axle, but it is easy to see that if the axle housing has sagged a little these bearings will be out of alignment and will be destroyed easily. Your chief object should be to see that the axle and its parts are thoroughly lined up; otherwise, new bearings would suffer the same trouble. If the bearings are worn, there is no other remedy than to replace them.

Some Motor Car Records

Q—Give name of car that has the most mileage per gallon of gasoline.

2—What is the brake horsepower of the Maxwell, also S. A. E. rating and N. A. C. C. rating?

3—Please advise if the Maxwell has any official records of speed and endurance tests.

4—What is a semi-floating rear axle, three-quarter and full-floating types?—Sidney O. Topness, Wolford, N. D.

1—So far as known no car has beaten the records of the Franklin in point of mileage. In 1903 or 1904 a four-cylinder Franklin was driven about 80 m.p.g., but on July 13, 1917, this record was beaten by a series 9 touring car with six cylinder engine. This occurred at New Haven, Conn., the driver, Tolman, going 82.8 m.p.g. under official test. At the same time a general test was held by Franklin cars all over the country, 179 cars taking part, and the general average was 40.3 m.p.g.

2—The N. A. C. C. rating of the Maxwell is 21 hp. We have no record of the

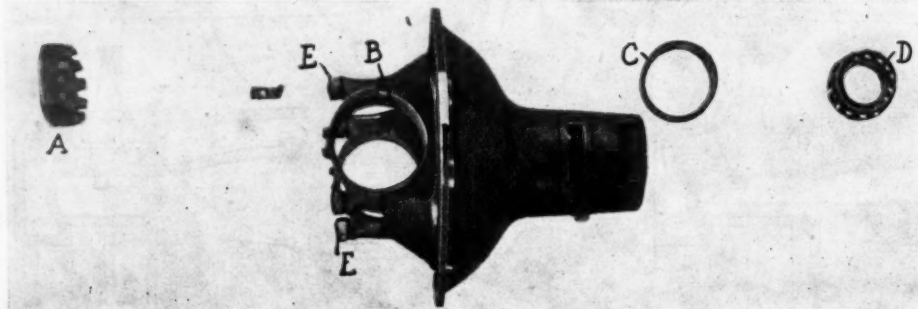


Fig. 1—Part of Oakland rear axle which carries bearing supports

brake test if any has been made. There is no S. A. E. horsepower rating.

3—The Maxwell has to its credit two very notable performances, besides others of minor importance by comparison. Under A. A. A. sanction in the winter of 1916-17 Ray McNamara and relief drivers piloted a Maxwell over the roads of Southern California for forty-four days and as many nights, stopping only for fuel and oil, and covered a total of 22,022.3 miles without ever stopping the engine. The daily average was 500.6 miles; the greatest average per gallon of gasoline, 28.33 miles; the smallest average, 18.20 miles; and the average tire life, 9871 miles.

Another important run was when McNamara drove a Maxwell truck from San Francisco to New York over the Lincoln highway in seventeen days, 8 hr. 20 min. The start was made July 17 and the car rolled into New York at noon Aug. 3. The total distance covered was 3428.7 miles; daily average, 197.8 miles; average running time, 16.54 m.p.h.; maximum speed, 20 m.p.h.; average fuel consumption, 11.7 m.p.g. of gasoline; average oil consumption, 326.54 m.p.g.; highest altitude attained, 8300 ft. It was figured the crankshaft of the engine revolved 17,180,229 times and the wheels 1,974,739 times.

Another time McNamara drove a Maxwell from Detroit to Indianapolis, then to Chicago and back to Detroit just inside of 24 hr.

4—This was described in MOTOR AGE, issue of Jan. 2.

Tractor Efficiency Queries

Q—What percentage of power is lost when transmitted through spur gear, through bevel gear and through worm gear? This applies to gears used in tractors.

2—Are heavy-duty engines, such as the Buda, as long-lived and as economical on kerosene or distillate as a one or two-cylinder engine for light and medium-sized gas tractors, up to 25 drawbar horsepower? Are they not more powerful and flexible, having lighter drive parts?

3—Give advantages of the crawler and wheel type of tractors?—C. P. Dean, Coupeville, Wash.

With equal workmanship and other conditions similar the spur gear is the most efficient, the bevel gear comes next and the worm gear last. However, with a worm and wheel the same reduction can be obtained as with two sets of spur or bevel gears in series, and one worm and wheel may be as efficient as two sets of spur or bevel gears in series. No definite figures can be given for the efficiency of either class of gearing, as this varies with the workmanship of the gears, the character of the lubricant employed, speed, power transmitted, etc. However, with spur gears as high an efficiency as 98 per cent has been obtained under favorable conditions.

The power of an engine does not depend upon its type, as single-cylinder engines of over 1000 hp. have been built whereas some four-cylinder engines develop less than 20 hp. However, considering tractor engines only, it is undoubtedly a fact that most of the more powerful engines are four-cylinder while most of the low-powered engines are single- and two-cylinder. A four-cylinder engine is generally more flexible than a one- or two-cylinder engine. The life of an engine depends more upon the proportioning of its parts than on its type. It is very difficult to draw conclusions regarding the com-

TO assist readers in obtaining as a unit all information contained in this department on a certain subject MOTOR AGE segregates inquiries into divisions of allied nature. Questions pertaining to engines are answered under that head, and so on.

MISCELLANEOUS

John B. Falsant.....Depew, N. Y.
Oliver Sveen.....Lake Mills, Iowa
Webster M. Wright.....Trenton, Mo.
W. E. Brown.....Penalasa, Kan.
Sidney O. Topness.....Wolford, N. D.
C. P. Dean.....Coupeville, Wash.
L. R. Pape.....East St. Louis, Ill.

THE ELECTRIC SYSTEM

C. W. Forney.....Thurman, Iowa
Oliver Sveen.....Lake Mills, Iowa
Lloyd Watters.....Neillsville, Wis.

ENGINES

Edgar Gifford.....Chicago
L. R. Pape.....East St. Louis, Ill.
William Severn.....Farley, Iowa
C. B. Jacobs.....Osage, Iowa

CARBURETION

Oliver Sveen.....Lake Mills, Iowa
Reader.....New Ulm, Tex.

REBUILDING

William Argens.....Seattle, Wash.
Sidney O. Topness.....Wolford, N. D.
E. W. Bird.....Fairmont, Minn.
C. H. Shippee, Jr.....Providence, R. I.
M. W. Glasier.....Madison, Wis.

No communication without the writer's name and address will be answered in these columns.

parative life of different types of engines. In fact, the life of an engine itself is a very indefinite thing. Tractor engines generally have all wearing parts renewable and can be kept in use indefinitely simply by replacing parts as they wear.

The advantage of the crawler type tractor is that its weight per unit of ground contact is much less than in a wheeled tractor, and the crawler tractor, therefore, can be used on muddy and sandy soil where a wheeled tractor would become stalled.

The advantage of the wheeled tractor is that it does not have to carry its track along, so that its mechanical efficiency may be considered above that of the crawler type.

Spark Plugs Foul

Q—There is oil on the spark plugs and in the combustion chambers of my model 37 Oldsmobile to such an extent that the car is practically of no service. This model has the force feed oil system, from a gear pump to the main bearings, through the crankshaft to the connecting rods. The following steps have been taken to remedy the trouble. The oil grooves in main bearing and connecting rod bearings

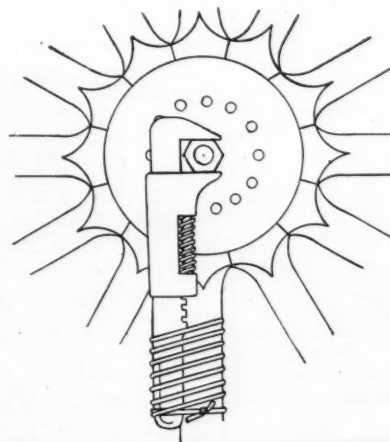


Fig. 2—Method for getting home with a sheared axle key suggested by Webster M. Wright

have been closed with solder and scraped to fit. Half the oil holes in the crankshaft are plugged. The cylinders are lapped out with a steel plug and new, oversize, four-ring Lynite pistons with Harward rings have been installed. The pistons were fitted with a clearance of 0.035-in. and the top corner of each ring filed. Baffle plates, slotted for the connecting rods, were installed under each cylinder. The main bearings were scraped, refitted and tightened and oil grooves were cut in the end of each bearing with holes in the cap to drain the oil out through the grooves, rather than allow it to leave the ends of the bearings and onto the cranks.

Double and triple head gaskets were installed to lessen the vacuum. All oil pressures from 24 down to 5 were tried. All grades of oil from Mobiloil E to 600W were used. The additional gaskets did nothing but cut the power of the engine, and tightening the main bearing and grooving did nothing but shift the trouble from the first three cylinders to the last two, indicating that that trouble is not with the pistons and rings. Is the crankcase, with a few changes, adapted to the splash system and would you advise such a change? Can you suggest anything not already tried?—L. R. Pape, East St. Louis, Ill.

Trouble in a case quite similar to yours was found to lie wholly in the adjustment of the air control, or choker, portion of the carburetor, and it is likely this is your difficulty—something easily overlooked. In the case mentioned the car had little power and the best it could do was 10 m.p.g., whereas after the trouble had been remedied it had no difficulty in making 20 m.p.g. Remove the carburetor and see if the choker control is not loose so that the damper-like parts do not open their maximum. This easily can be taken up so the choker will have full swing both for closing and opening.

It is easy to understand that if this is the trouble the engine cannot utilize all the fuel that will be drawn into the cylinders, for choking down the air means more fuel will be taken in by the increased suction effect. This added amount of fuel cannot be burned and so must find its way past the rings and into the crankcase, not only having the effect of raising the oil level but of thinning out the oil to such a consistency that it not only will not lubricate properly but readily will pass the rings and foul the plugs. At the same time it is not closing the spaces between the cylinder walls and pistons, and thus compression and power are being lost. The effect will be that the bearings, cylinder walls and pistons will be scored; the engine will lack power and eventually will be ruined. Using the heaviest oil will have little effect, for it will take only a short time for the gasoline to thin the oil. Do not change the oiling system.

The Electric System

Wants Battery Information

Q—Give name and address of a firm near here who deals in or handles the Edison storage battery.

2—Give advantages or in what way it is superior to other batteries.

3—Would it be practicable or possible to install a switch on a Maxwell 25, 1917 model touring car that would directly connect the four dry cells used to assist in starting with the coil so that the engine could be started by cranking by hand, without pressing down the starting pedal? The car has a Simms magneto, which is very hard to start in cold weather and taxes the starting or storage battery severely and keeps it in an almost exhausted state most of the time, so that it freezes and to save it I have to crank by hand. I want to use the dry cells to start the engine and then switch off and run on the magneto.—C. W. Forney, Thurman, Iowa.

1-2—H. H. Phew, 1108 Farnum street, Omaha, Neb., is the district representative for the Edison battery. MOTOR AGE can-

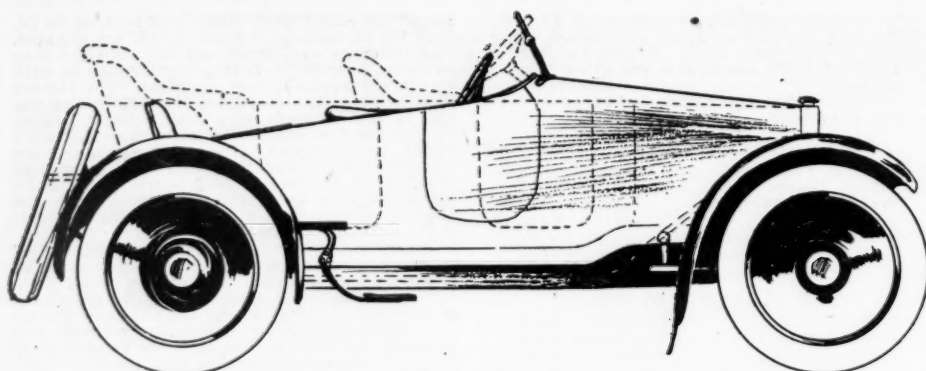


Fig. 4—Suggestion for converting Overland 80 into a speedster

not give advice as to relative merits. The most it could do would be to state the claims of the makers and this can be procured from their literature. It can be stated, however, that the use to which a battery will be put will have some bearing on the situation.

3—It is, both. This was explained in *MOTOR AGE* of Dec. 26, page 37.

Cadmium Test Outfit

Q—Where can I get an outfit for the cadmium test for batteries? I have a Weston combination volt-ammeter. By the cadmium test can I determine in what shape the plates are? For example, I often get a battery with one cell completely dead and the others up in gravity. Can I test and find out in what shape the other cells are in? They might be up in gravity and still might be on the very last, so when I get one cell fixed another one will go bad after awhile, as it often does in a battery which has been in service for a year or so.

2—Are all Delco systems the same? How shall I proceed to install an ammeter on all the Delcos?—Oliver Sween, Lake Mills, Iowa.

1—A cadmium outfit can be purchased from any of the larger battery concerns. This test usually is applied when a battery fails to come up to charge after being reinsulated. The idea is that it will tell whether the positive or negative plates are at fault. A battery a year old or more generally is in need of new insulators, and if one or more cells are dead it is good procedure to go through the entire battery and do the work correctly. Many batteries which do not show up well in a cadmium test will give good service for a long time if well insulated.

2—No, all Delco systems are not alike, and it would be necessary to know to what system you refer to before instructions for installing an ammeter could be given. At the same time it would be well to state the make and model of car on which the particular Delco system is used.

Old-Type Battery

Q—What is the address of the company that makes the electric air pump which takes its current from the storage battery of the car?

2—I have an Exide storage battery four years old which when fully charged tests 1.265. Would you advise adding enough acid to bring it up to 1.300? If not, why not?—Lloyd Waters, Nellisville, Wis.

1—We have no record of such a concern, but perhaps some of our readers can give you this information.

2—A battery that is four years old has practically served its time; at best it will need a complete overhauling. Adding acid will not help you, for the acid does not evaporate. When fully charged it should show 1.280 to 1.300 specific gravity and should not drop to 1.265. If it has never been down for washing it should be looked into, for it is likely the plates are buckled.

A goodly amount of sediment may be causing a short-circuit, and in all probability the separators are practically gone. Washing a battery means to take out the cells, washing the plates and jars but not allowing the plates to become dry, putting in new separators and new electrolyte and then recharging slowly for three or four days. Old-type batteries should be washed at least once a year and as they grow in age, more frequently. You will likely find many of the plates practically gone, but if only a few are in bad shape, perhaps a battery man can replace the worst with some about equal to the best ones in your battery. This would seem to be a case for a battery builder to give a thorough inspection and a complete overhauling. At that it is doubtful if it is worth the attempt.

Engines

Cylinder Head Casting

Q—Why is the cylinder head casting in the engine of a Ford 1-ton stock truck fully $\frac{3}{8}$ in. thicker than that in my 1916 Ford?

2—What is the object of increasing the thickness of the casting?

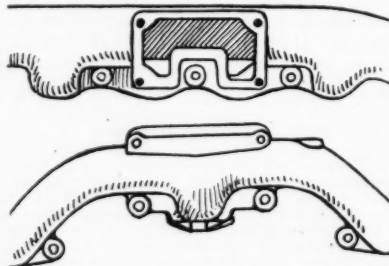


Fig. 5—Top and side view of Chalmers hot-spot

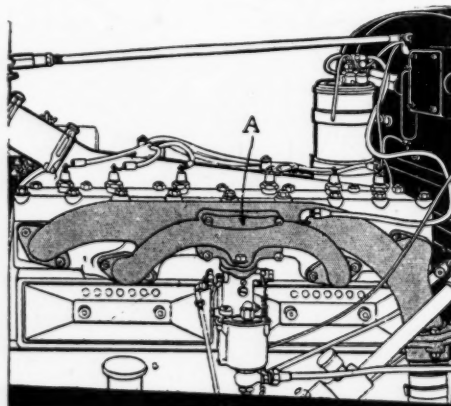


Fig. 6—Exterior of Chalmers engine, showing location of hot-spot

3—Does it carry more water and aid the cooling?

4—To what degree, if so?

5—Can such a head be bought and installed on a 1916 engine, and for how much?—Edgar Gifford, Chicago.

1—The stock in the cylinder head casting is not thicker than usual, but added water space is afforded because of the heavier work the truck engine is called upon to do. It must be remembered that the truck is geared considerably lower than a touring car, that as a consequence the engine makes more revolutions in traveling a given distance and this means many more explosions in the cylinders, which naturally must mean more heat. This must be cared for in some manner, since the slower speed of the car will not cause as much draft through the radiator to carry off heat.

2, 3, 4—See answer to 1.

5—Probably the Ford company can furnish this head, but it should not be necessary on a touring car unless it is driven in very hard going and at excessive speeds. A similar head, made by the Green Engineering Co., was described on page 45 of the Dec. 12 issue of *MOTOR AGE*. It is claimed this will give twice as much water around the head of the engine as the ordinary Ford head.

Locating Tapping in Engine

Q—The engine makes a noise similar to tapping a cast-iron plate with a light hammer. This noise is very noticeable at idling speed and while pulling at low speeds and is in synchronism with the camshaft speed. All bearings, including camshaft bearings, are tight. There is no end play in the cam or main shaft and the pushrods are properly adjusted. Can you suggest any cause for such a noise?

2—What will cause engine speed to vary when idling?—L. R. Pape, East St. Louis, Ill.

This might be caused by any one of a dozen things and it is not easy to diagnose a case of this sort at a distance and with so little information. Take a small iron rod— $\frac{3}{8}$ or $\frac{1}{2}$ in. and about 2 ft. long. Use this as a stethoscope. By running the engine slowly and placing one end of the bar between or against the teeth and the other end on parts of the engine whence the noise seems to come, it readily can be traced. Touch the bar here and there, and gradually you will be able to note that the sound is coming nearer. You can trace it without trouble in this manner.

2—An engine will increase and decrease its speed when idling by too rich or too lean a mixture. It would not be astonishing that your engine acted this way if the trouble is found in the choke arrangement. Where the mixture is too thin and the supply is used up for a moment, the engine must be starved until a new supply can be had, and if too rich it will slow down for a moment until the surplus has been used up.

Engine Stops at Turns

Q—I have a 1914 Maxwell 25 equipped with a Zephyr carburetor. Running at 20 m.p.h. it runs smoothly, but when I slow down to turn a corner the engine will stop entirely and I have to crank it. The black smoke comes from the exhaust for a few seconds, then it seems all right. When I use more gasoline the same trouble occurs. What causes this and what is the remedy?

2—What kind and size carburetor does the Maxwell use at present?—C. B. Jacobs, Osage, Iowa.

1—It is probable the throttle lever or some of the connections between it and the throttle arm on the carburetor are loose, and when the car is turning a corner

the lever, through centrifugal force, is permitted to close the throttle and thereby shut off the gas from entering the cylinders. The black smoke may be accounted for by too rich a mixture or the gas that has condensed in the intake pipe. You probably are using too rich a mixture anyway.

2—The Maxwell used to use a Kingston, model D, but now uses a 1¼-in. Johnson.

Wants Oversize Pistons

Q—There is piston slap in my B37 1914 Buick. Would C37 Buick pistons fit and work satisfactorily? Where can I get 0.005 oversize pistons? Will it be necessary to have them made?—William Severn, Farley, Iowa.

The pistons in the B37 Buick are longer than those used in the C37 model and therefore, those in the C37 could not be used. Nor does the Buick company make oversize pistons. It will be necessary to have new ones cast to get the oversize.

Rebuilding

Overland 80 Speedster

Q—Publish suggestion for converting a 1915 model 80 Overland, five-passenger, into a speedster.—William Argens, Seattle, Wash.

This is shown in Fig. 4.

Lowering Maxwell Engine

Q—If the engine of a Maxwell is placed so that the torque tube is level with front axle, would this give more power to rear wheels?

2—What percentage of power is lost through the driveshaft?—Sidney O. Topness, Wolford, N. D.

1—By lowering the engine as described a little power would be conserved, but it would be slight. This would do away with the universal joint, which naturally absorbs some power.

2—This would have to include the driving pinion, universal joints and transmission parts. A total of about 6.6 per cent is lost between the engine and the ground at the rear tires. Much would depend upon conditions all through—on the freedom of brakes, state of lubrication, etc. One authority gives the following losses, taking the fuel value at 100 per cent: Cooling water, 35.8 per cent; exhaust gas, direct radiation, 35.6; exhaust pipes and muffler, 2.2; engine friction, 5.6; transmission friction, 2.9; rear tires, 3.7; front tires, 1.1; front wheels, 0.6; air resistance, 7.1.

Rebuilding Colby For Truck

Q—I want to rebuild a heavy seven-passenger Colby car to be used as a truck for rural motor express work. It is equipped with a 4¼ by 5¼-in. Continental, four-cylinder engine, unit power-plant, Timken axles and 36 by 4½ wheels. Can I equip this with an express body, 36 by 6 pneumatic truck tires and make it capable of carrying 1½ tons at a speed of 20 m.p.h.? Would the present axles be suitable for this work or would it require a change in gear ratio? 2—What make of transmission, clutch and steering gear were used on this model?—E. W. Bird, Fairmont, Minn.

1—We believe it will be necessary to lower the gear ratio by changing the driving pinion and ring gear sizes or by cutting down the rear wheels, for to carry a 1½-ton load at the present gear ratio will overload the engine, particularly if the going is at all heavy. As a matter of fact, it would prove more satisfactory to use a special truck axle, which will give a lower gear ratio and at the same time sufficient strength to carry the load. The Timken people can furnish what you want if you will give them details.

2—MOTOR AGE has no record of the make

of transmission, clutch or steering gear used on the Colby.

Body for 1917 Davis

Q—I have a 1917 Davis chassis, 119-in. wheelbase, for which I cannot find a four- or five-passenger used body. Can a seven-passenger Hudson Super-Six body, which is 8 in. too long, be cut between the front and rear seats to fit my chassis? We could not take any off the front on account of leaving enough room for foot control.—C. H. Shippee, Jr., Providence, R. I.

There is no reason why this body could not be made to fit the Davis chassis, but, of course, a section of the sill will have to come out and a new section be put in. In this case the section should be well bolted in and it will be necessary to add two bolts to hold the body to the frame to avoid any possibility of the sill giving way and permitting the body to tilt back on a rough road. It will be best to take the 8 in. out immediately back of the door, for you would not want to make the door smaller. If you can get along with a narrower door, you will have an easier rebuilding task, for then only the door needs be rebuilt, but this probably would be impracticable.

Carburetion

Chalmers Hot-Spot

Q—Explain what the Chalmers' hot-spot is and what it is for?—Oliver Sveen, Lake Mills, Iowa.

The Chalmers hot-spot is designed to heat the gas going into the combustion chamber and thereby turn into a dry, easily volatile gas the heavier oils that are to be found in the ordinary gasoline on the market to-day. In general the incoming gas strikes a spot in the manifold that is heated by the exhaust striking the outside of the spot in the casting, and this heat immediately volatilizes the heavier portions of the gasoline.

It is within the understanding of anybody that, this being the case, a smaller quantity of fuel need be fed through the carburetor to obtain a combustible mixture, and because of this it spells economy.

The hot-spot, as it appears on the engine, is shown in Fig. 6. It is within the box-like portion A. As will be noticed, the carburetor is placed well up and close to the manifold, this alone tending to shorten the distance the gas has to travel and thereby preventing to a large extent condensation, making a dry receptacle for the incoming charge. The incoming gas must pass a spot cast in the manifold that is in the path of the exhaust gas, which heats the outside of the spot. The incoming gas, be it understood, does not come in contact with the exhaust gas but passes through a hole through the hot-spot casting, so it is immediately changed to a dry gas, being more easily ignited, using considerably less fuel, preventing loading and knocking and also eliminating to a considerable degree carbon deposits. A further idea of the hot-spot is shown in the sectional drawing in Fig. 5.

Adjusting Stewart Carburetor

Q—Give instructions for adjusting Stewart carburetor on 1915 model Dodge Brothers car.—Reader, New Ulm, Tex.

Adjustment of the Stewart carburetor on the Dodge Brothers car was explained in the Jan. 2 issue of MOTOR AGE in answer to inquiry by W. L. Brown.

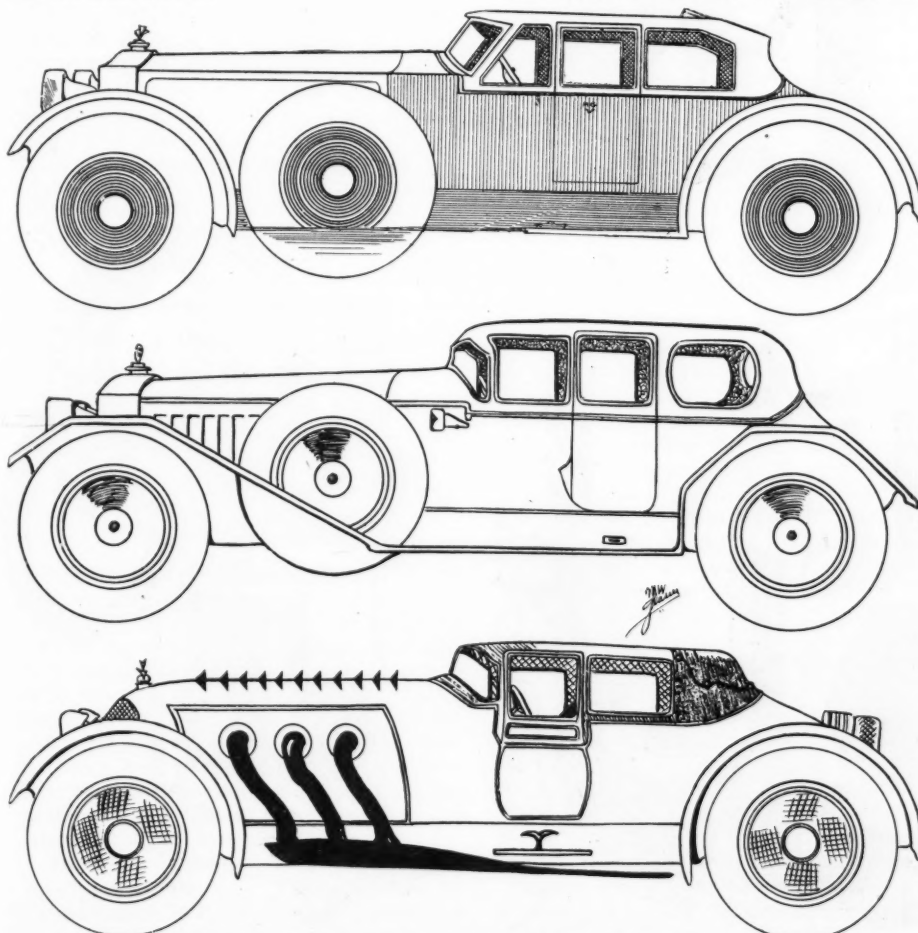


Fig. 7—Three original car designs by a reader, M. W. Glasier, Madison, Wis.

Service Equipment

Time Savers of the Shop

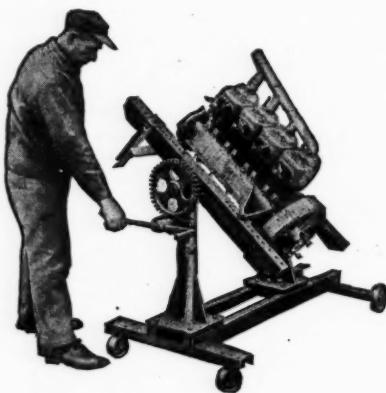
Haywood Products

THE Haywood Tire & Equipment Co., Indianapolis, Ind., is making a vulcanizing plant called Liberty model No. 2, which is designed to meet the needs of the garage-man. It will take care of tires from 2½ to 4 in., it being possible to cure two tires of different size at one time in the air bag mold, one tire on the inside curing mold and several tubes. This is a coal-burning plant with two burners. By heating a double steam dome contained inside the metal casing the steam very quickly is raised, and it is no trouble to keep even heat for any length of time, it is claimed. The three-cavity air bag mold, designed to be used with almost any of the equipment and arranged to take care of all popular sizes of tires, also is illustrated. This device permits you to effect a cure on a tire from bead to bead at one heat. To attach, you remove the sectional molds, attach the new set of molds, screw a cap over the remaining pipe openings and go ahead. The three-cavity mold has eight sets of bead plates, the two-cavity five sets. The three-cavity molds handle tires from 2½ up to and including 5 in., while the two-cavity handles them from 2½ to 4 in. Single-cavity molds also can be furnished.

Manley Engine Stands

The principle of operation of all the Manley stands, which are made by the United Engine & Mfg. Co., Hanover, Pa., is the same, namely, the braces traveling in the uprights to rigidly clamp in any position. The stands are universal in all their adjustments, and the fittings furnished as part of the equipment enable the mounting

of any form of engine suspension in practical use, it is said. The geared stands consist of one geared upright and one regular upright with the locking brace. It is possible for one man to turn over an ordinary engine with the plain stand simply by grasping the cross arms, and two men can turn any engine over. With the geared stand, however, one man does it with the greatest ease, and this is considered especially valuable on the No. 2 stand, which is best adapted to the heavy engines of the big cars and marine and airplane engines. The stands also can be used for holding transmissions, rear axles, etc., which are clamped to the cross arms and can be elevated to the proper height to work at the best advantage. A swinging and removable crane is supplied with any stand except the Ford special. This is supported from the stationary upright in a socket



Manley engine stand

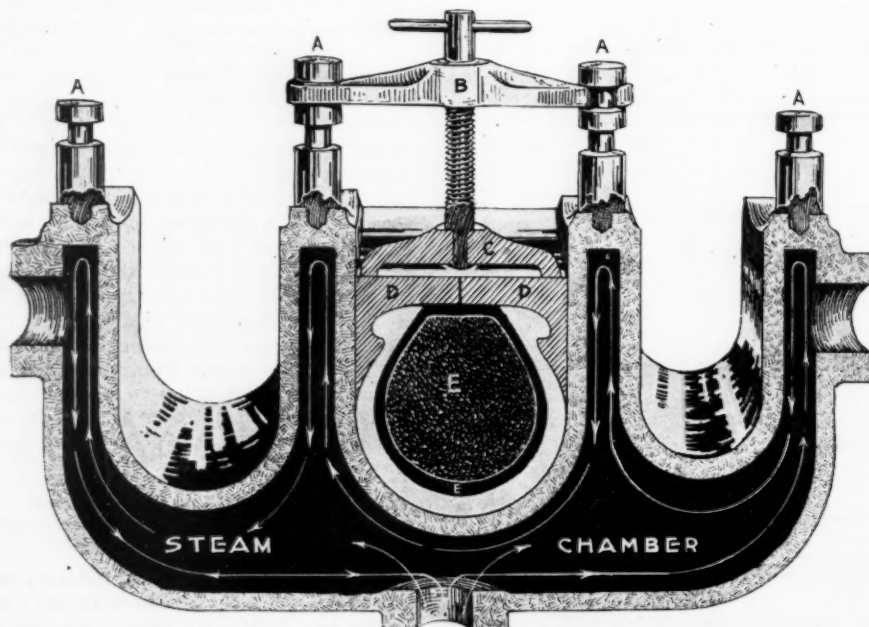
cast integral with it. It swings out to pick the engine from the floor, then around and over the cross arms after the engine has been elevated. The crane is made of 1½ in. double thick pipe thoroughly braced and trussed and is to be used with a small chain hoist or blocks and rope, which practically every shop already has.

Union Tool Chests

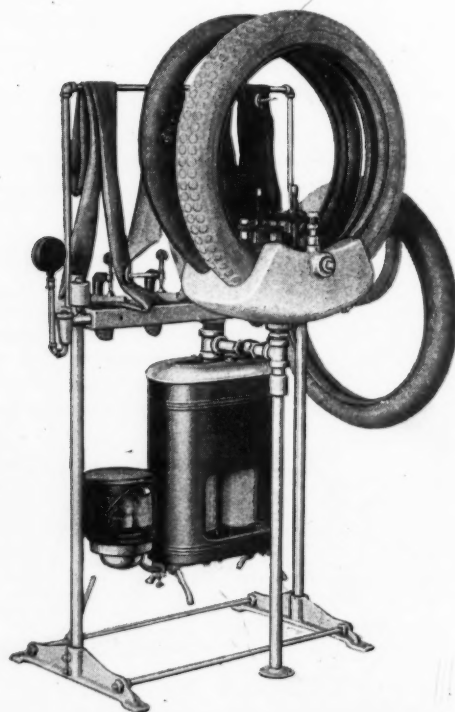
The tool chests made by the Union Tool Chest Co., Inc., Rochester, N. Y., are made with several drawers of different sizes to hold different kinds and classes of tools and instruments. The drawer construction is strong but light. The fronts are locked to the sides with a double lock joint, and the three-ply bottom is tongued to the sides and front. The drawer pulls are rings which drop down flush. The frames are lock-cornered and glued. Model E, with seven drawers, each of quartered oak and felt-lined drawers, sells for \$14. Model B is \$16.

Curved Bearing Scrapers

The bearing scrapers made by Kraeuter & Co., 569-585 Eighteenth street, Newark, N. J., have the flat under side depressed ⅛ in., the cutting edges being ⅜ in. wide so that they can be sharpened with a few rubs on an oil stone. The scrapers are made of English file steel, hardened and tempered and packed in sets of three different sizes of three of the same size. The lengths are 10, 12 and 13 in.



Haywood three-cavity air-bag mold which can take care of all popular tire sizes, left, and Haywood Liberty No. 2 vulcanizer



Among the Makers and Dealers

Short Trade Notes

LEACH Becomes Dort G. S. M.—Wade H. Leach assumed the duties of general sales manager of the Dort Motor Car Co., Dec. 1. For the last two years he has been interested in the Chicago Motor Co., Chicago, Jordan distributor.

Manager Buys Detroit Winton Branch—George H. Zuver has purchased the Detroit branch of the Winton Co., of which he has been manager, and will conduct the business under his own name. About Jan. 15 Mr. Zuver expects to move the Winton to new quarters.

Distributor Buys Maxwell-Chalmers Branch—John H. Thompson of the Thompson Auto Co., Detroit, has purchased the Maxwell-Chalmers factory branch and service station and will handle the distribution of both Maxwell and Chalmers cars for Detroit as well as Michigan.

Service Men Organize Welding Concern—W. S. Burch and A. E. Barnhart, Detroit, for years with Chevrolet in its service department, have organized the Modern Welding Co. The new concern has completed its first big job and is equipped to care for the repairs of any car.

Kendall Heads Detroit Branch—Walter B. Kendall, formerly manager of the Boston, Mass., branch of the Westinghouse Air Spring Co., has assumed the management of the factory branch office of the company in Detroit. He succeeds Ernest B. Murray, who died last fall.

Moline Plow Promotes Longbon—William J. Longbon, who has been manager of the Columbus, Ohio, branch of the Moline Plow Co., has become trade manager of the Moline tractor and tractor-drawn implement department. He will have charge of all the territory east of the Mississippi river and will make Columbus his headquarters for a time

at least. N. K. Hemingway, who has been assistant manager at the Columbus branch, has been promoted to manager.

Nelson Vice-President Dies—Clarence A. Nelson, vice-president of the Nelson Motor Truck Co., and also vice-president of Nelson Bros. Co., both of Saginaw, Mich., recently died.

Budlong Retires from Export Firm—Milton J. Budlong has retired as vice-president, general manager and a director of the export firm of Gaston, Williams & Wigmore, New York. His plans for the future have not been made public.

Globe Seamless Tube Rebuilding—Within three days after fire destroyed the receiving, shipping and storage building of the Globe Seamless Steel Tubes Co., Milwaukee, Wis., Dec. 29 contracts had been awarded for the construction and equipment of a new building. It will be 200 by 325 ft. and will be completed in forty to fifty days.

Allis-Chalmers Will Add—The Allis-Chalmers Mfg. Co., Milwaukee, Wis., is erecting a large addition to its main works in West Allis, where it will concentrate its tractor manufacturing department and greatly enlarge the output, in addition to producing two new types to supplement the standard model of the past. Allis-Chalmers tractors now are being made in the Reliance works in Milwaukee, but operations in the new tractor plant at West Allis will begin early in the spring.

Ghent Plant Brings \$5,382—At a meeting of the trustees of the Ghent Motor Co., Ottawa, Ill., a bid of A. L. Richards of \$5,382 for the plant was accepted by the referee in bankruptcy. The highest bid previously was \$2,979, submitted by a Chicago firm. This was not satisfactory to the trustees. Lumber and other assets had been sold at private sale

preceding. The plans of the purchaser are not announced, but it is understood that the plant will be reopened. The purchaser is said to have ample financial backing and some enlargements and the manufacture of motor vehicles are contemplated.

Brogan Goes to B. & D.—Jan. 15 Graham W. Brogan will assume the duties of advertising manager for the Black & Decker Mfg. Co., Baltimore. He was formerly advertising manager for the Duesenberg Motor Corp.

Saxon Dealers Open for Business—Harry G. Wilson, Detroit, has formally opened his new showrooms for the distribution of Saxon cars. Mr. Wilson will handle Saxon sales and service for twelve Michigan counties. He formerly was connected with the George W. Franklin Co. and is well known to the Detroit retail trade.

Christmas Bonuses to Old Employees—The Durant-Dort Carriage Co., Flint, Mich., this year distributed \$40,000 as Christmas bonuses among its old employees as a reward for their loyalty and merit in the service of the company. The smallest amount given was \$60, and the largest \$2,750, the latter going to a worker who had been with the concern for twenty-seven years.

Maker of Lubricators Changes Name—The Madison-Kipp Co. is the new corporate style of the Madison-Kipp Lubricator Co., Madison, Wis., one of the largest exclusive makers of force-feed lubricating devices and systems in the United States. During the last year the company manufactured oilers for tanks, tractors and other war machinery, besides producing the oiling systems for nearly two-thirds of all the farm tractors manufactured in the country. The officers of the company are: President, Thomas Coleman; vice-president, T. E. Coleman; secretary, A. X. Merz; treasurer, W. H. Putnam.

Big Business Awaits Live Dealers

(Concluded from page 91)

the ability of the factory to get out cars in good and sufficient quantity.—James Levy Motors Co., Chicago.

Industry Must Advertise to Overcome Apathy

IT seems to us that the question is not so much present demand, as the absolute necessity on the part not only of the motor car dealers, but merchants in all other lines, actively co-operating to shake the people out of their lethargy and non-spending habits induced by the past eighteen months of propaganda carried on by our dollar-a-year men, who have been serving in Washington, who have educated the people to skimp and save, putting every dollar of surplus in war savings stamps and liberty bonds.

A counter-campaign of education must now be carried on and it must be done by the merchants in the individual communities to counteract this previous propaganda and putting the fact over to the public that they

are now at liberty to go out and resume a normal method of living and spending. Never before in the history of the motor vehicle industry has there been just reason for an enormous demand for motor vehicles of all kinds and types than should exist during 1919. The normal production has been curtailed during the past year and many people who should have purchased new automobiles during the past year or eighteen months have been driving the old car, getting by as best they could and facing heavier repair bills in order to keep it running rather than make the investment in a new vehicle.

The general public has more money than ever before in its history, as is evidenced by the top level of deposits in both savings banks and commercial banks, in addition to the enormous volume of Federal securities which have been absorbed in the last few months.

Labor conditions are fast returning to normal, but because of radical decreases in price of several makes of automobiles, the buying public has been pretty thoroughly

imbued with the idea that there are going to be reductions all along the line, and it has had a decided tendency to slow up the buying of motor vehicles.

The factories must join with the local dealers in a nation-wide advertising propaganda campaign to bring the general public back to a realization of the necessity of a motor car, not only for their pleasure, but for business purposes as well.

Success of Campaigns

When it is possible through an advertising propaganda campaign to get the American people to save over 750,000 tons of sugar in twelve months, it should be apparent what can be accomplished through the right kind of a publicity and propaganda campaign. Having carried on campaigns whose sole object has been to get the people to save, these campaigns have been so successful that they certainly have accomplished their object, and now opposite campaigns must be inaugurated to get the people back to a normal habit of living and spending.—H. L. Arnold, Los Angeles, Cal.

From the Four Winds

Glimpses at the World of Motordom

OHIO Bridges a Muddy Stretch—The brick pavement between Canton and Akron, which has been one of the worst pieces of important highway in northern Ohio, has been completed and is now open to the public. The paving of the road was agitated by the clubs in the two cities for years before it was undertaken.

Texas Reviews Registration Period—Texas has issued a statement showing that the total number of motor vehicle license numbers supplied by it since the law requiring the registration of motor vehicles became effective in

June, 1917, up to Jan. 1, 1919, was 202,059. During 1918 alone 251,118 motor vehicles were registered. Other registration figures for 1918 are as follows: Transfers recorded, 24,514; chauffeurs, 22,738; motorcycles, 3266; 4002 dealers' general distinguishing numbers issued to 2351 dealers.

Little Rock Recovers Most Stolen Cars—The police department of Little Rock, Ark., made a record of recovering to the owner 95 per cent of the cars stolen last year. Dec. 20 535 had been stolen and reported to police headquarters. All but twenty-five had been

recovered, besides cars from other places that had been picked up by the police there. Chief of Police Burl C. Rotenberry has a squad of plain clothes men assigned to the work of capturing car thieves and recovering stolen cars. He has had bulletin boards erected in several public places where the number and description of stolen cars are posted as soon as reported.

First Car for Canton, China—No longer is the famous old Chinese city of 1,250,000 inhabitants to lack the sound of the motor car's horn and see its rapid passage. A high official of the Chinese government is buying a Nash from the Pacific Motor Co., Hong Kong, China, for use there. Much good it will do him. In the entire Canton district there is one road, and one only, and that is just 3 miles long.

Road Work Coming Back Slowly—Road-building in New York will not reach pre-war proportions for at least two years, according to Commissioner Edwin Duffy of the state highway commission. One of the first paving contracts to be awarded will be that for the improvement of the Canisteo-Whitesville highway. There is a gap of 18 miles to be paved. Steuben county now has \$66,000 available for the paving of the roadway.

Garagemen to Ask Legislation—The Philadelphia Garage Association is preparing for its first annual banquet, which will be held at the Hotel Adelphia on the night of Feb. 12. It is intended to make this affair fully equal to last summer's successful run to Atlantic City and return. At the next meeting a committee will be appointed to draft a new bill to be presented to the legislature, designed to protect garagemen in the state in various ways, including forced remuneration for repairing and storage. The new measure will be radically different from the last one proposed by the association.

Road-Building Held Up—Road-building in New York State will not reach pre-war proportions for at least two years, according to Commissioner Edwin Duffy of the state highway commission. Many of the divisions are badly disorganized; valuable employees are still in service and money is not yet available. One of the first paving contracts to be awarded will be that for the improvement of the Canisteo-Whitesville highway. There is a gap of 18 miles to be paved. Steuben county now has \$66,000 available for the paving of the roadway. Material will have to be hauled from Canisteo by truck, adding \$4,000 a mile to construction cost. Other road work probably will be begun later in the spring or summer.

Ace Back with Goodyear—Maj. William Ryan, ace extraordinary, is back with the Goodyear Tire & Rubber Co. at Akron, Ohio. This aviator, who formerly worked in the company's factory library, has seen service in France and Gallipoli. He has to his credit, officially, the destruction of eleven enemy planes and bears four decorations awarded for distinguished service. He was captured by the Germans once and placed in a prison camp north of Metz. Here he was sentenced to death as a spy. The night before his execution was to have taken place he and another Yankee flyer overpowered the guard and escaped to France in an officer's car. How's that for a nice little story to tell the grandchildren when he is an old man?

Coming Motor Events

SHOWS

Milwaukee, Wis.	Milwaukee Automobile Dealers, Inc.	Jan. 24-30
Fargo, N. D.	Implement Dealers' Association, tractors.	Jan. 22-24
Chicago	Automobile Trade Association, cars.	Jan. 25-Feb. 1
Toledo, Ohio	Automobile Trade Association, trucks.	Jan. 27-Feb. 1
Chicago	Automobile Trade Association, trucks.	Feb. 3-6
New York	Automobile Dealers' Association, cars.	Feb. 1-8
Fargo, N. D.	Automobile Dealers' Association, cars.	Feb. 4-7
San Francisco	Motor Car Dealers Association.	Feb. 6-15
New York	Automobile Dealers' Association, trucks.	Feb. 10-15
Albany, N. Y.	Automobile Dealers' Association.	Feb. 15-22
Cleveland, Ohio	Automobile Trades Association.	Feb. 15-22
Rochester, N. Y.	Automobile Dealers' Association.	Feb. 15-22
Louisville, Ky.	Auto Dealers' Association, automotive.	Feb. 17-22
Newark, N. J.	N. J. Auto Exhibition Co.	Feb. 15-22
Minneapolis, Minn.	Northwestern Automotive Exposition.	Feb. 15-22
Des Moines, Iowa	Automobile Dealers' Association, automotive.	Feb. 17-22
Grand Rapids, Mich.	Automobile Business Association.	Feb. 17-22
South Bethlehem, Pa.	Lehigh Valley Auto Shows Co., cars.	Feb. 17-24
St. Louis, Mo.	Manufacturers' and Dealers' Association.	Feb. 17-22
Wichita, Kan.	Wichita Tractor and Thresher Club.	Feb. 18-22
South Bethlehem, Pa.	Lehigh Valley Auto Shows Co., trucks.	Feb. 24-27
Springfield, Mass.	Cars and trucks.	Feb. 24-March 1
Kansas City, Mo.	Motor Dealers' Association, cars.	Feb. 24-March 1
Kansas City, Mo.	Kansas City Tractor Club, tractors.	Feb. 24-March 1
Portland, Ore.	Dealers' Motor Car Association.	Feb. 24-March 1
Cedar Rapids, Iowa		Feb. 24-March 1
Burlington, Iowa		Feb. 24-March 1
Duluth, Minn.		Feb. 25-March 1
Detroit	Automobile Dealers' Association.	March 1-8
Columbus, Ohio	Automobile Show Co.	March 3-8
Buffalo, N. Y.	Automobile Dealers' Association.	March 3-8
Quincy, Ill.	Automobile Trade Association.	March 5-8
Omaha, Neb.	Automobile Trade Association, automotive.	March 10-15
Syracuse, N. Y.	Automobile Dealers' Association.	March 10-15
St. Joseph, Mo.	Dealers' Association.	March 12-15
Boston, Mass.	Automobile Dealers' Association, cars.	March 15-22
Harrisburg, Pa.	Motor Dealers' Association.	March 15-22
Brooklyn, N. Y.	Motor Vehicle Dealers' Association, cars.	March 22-29
Trenton, N. J.	Auto Trade Association.	March 22-29
Pittsburgh, Pa.	Automobile Dealers' Association.	March 22-29
Brooklyn, N. Y.	Motor Vehicle Dealers' Association, trucks.	April 1-5

SHOW DATES INDEFINITE

Bridgeport, Conn.	City Battalion.	Not Decided
Hartford, Conn.	Automobile Dealers' Association.	Not Decided
Indianapolis, Ind.	Automobile Trade Association.	Not Decided
Little Rock, Ark.	Automobile Dealers' Association.	Not Decided
Philadelphia, Pa.	Automobile Trade Association.	March
Philadelphia, Pa.	Motor Truck Association.	March
Utica, N. Y.	Motor Dealers' Association.	March

MEETINGS

Chicago	Motor and Accessory Manufacturers' Association.	Jan. 29
Chicago	National Automobile Dealers' Association.	Jan. 28-29
New York	Society of Automotive Engineers.	Feb. 4-6
New York	American Road Builders' Association.	Feb. 25-28
Hot Springs, Va.	Automotive Equipment Association.	June 2-6

RACES

Indianapolis, Ind.	500-Mile Sweepstakes.	May 31
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